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NOTICES:—All communications relating to editorial matter should be addressed to the Editor who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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An Honourable Settlement

THE railway strike is over, and the settlement has fairly been described as "honourable" to both sides. This is infinitely better than a defeat for either party. Neither the community nor the railwaymen have been defeated; the only party which has been defeated—and its defeat cannot be too complete—is the misguided party which believes in strikes as the only way to reform. The only victory in this case is one of reason over force, and it is one on which all parties may congratulate themselves. If the struggle had continued, and the nation, in self-defence, had beaten the railwaymen and, indeed, the allied unions, it would have brought no gain, but only loss to everybody. If, on the other hand, the unions had beaten the nation, again it would have brought no gain, but loss to all. And the struggle, if it had come about, would have placed both parties in a false position. For the unions would have been fighting the State, of which they are an integral part, and whose prosperity is ultimately the measure of their own. And the State would have been fighting the very Labour whose contentment and industry are indispensable to its own stability and progress.

No idea has less foundation in fact than the idea that the nation as a whole is against Labour and the organisation of Labour. On the contrary, what it desires is that Labour should bring its humanising influence more and more into the common life of the State, instead of holding aloof as an esoteric sect, and encouraging the false notion that it is something different and apart from the rest of us. It was a sharp struggle while it lasted. It carried us very near the verge of disaster. But the situation was saved by two elements—the good sense and good humour of the nation, and the wise influence exerted in the last and most critical stage by the real statesmen of the Labour movement. We note with satisfaction that Mr. Clynes, Mr. Roberts, and a few others are now speaking out in rather slashing style against the dangerous policy which would force Labour and the nation into the position of mutually hostile forces. Perhaps it would have been better still if they had spoken out as frankly before they became Cabinet Ministers, for such words are most effective in the inner counsels of Labour, and especially in the workshops. Once more, as a nation, we have come safely through a grave crisis. The experience has had a sobering effect on all, and now what the country needs is a co-operative effort to build up what has been thrown down, and to make good the losses of the war.

Blue Sulphate of Ammonia

THOSE who are associated in practice with the working-up of sulphate of ammonia are only too familiar with the tricks in which the process occasionally indulges, producing a salt which suddenly assumes a blue, yellow, or red colouration. It is the blue variety which is most commonly found, and while it is said that this type of salt is just as effective as the usual white product, sentiment enters largely into the question, and buyers usually demand some guarantee that what they receive shall be "of good white appearance." In spite of the fact that many theories have been advanced to account for the formation of blue salt, it still makes its fitful appearances, even though all the recognised precautions may be taken to prevent its formation. For instance, the most popular theory puts down the trouble to local alkalinity in the saturator. This may be caused by improper acid or ammonia distribution, or by the attendant omitting to watch carefully the gravity of the bath, which may temporarily fall below the correct working figure. Certainly, experience goes to prove that, if a gravity of 58° Tw. is consistently maintained, considerable relief follows, but even this is no guarantee of

complete immunity from the effect of blue colouring agents.

We refer to the matter here for the reason that new information on the subject is always worth studying, and we notice that in Germany some more or less novel points have recently been raised by A. Thau. This investigator gives the opinion that, as the formation of blue salt may occur even though ideal conditions prevail in the saturator, there is every reason to suppose that the cyanide compounds responsible for the defect are formed prior to this portion of the plant being reached. He blames in particular the iron connecting pipes which are employed between the still and the saturator, and says that the metal, exposed to the sulphuretted hydrogen passing along with the ammonia, assumes, after a time, a skin coating of iron sulphide. This sulphide ultimately reacts with the hydrocyanic acid in the vapours, and is converted into Prussian blue, the effects of a very small quantity of which are well known. Thau suggests that the remedy lies in maintaining as high a temperature as possible, and in admitting steam in excess of the usual quantity employed. It is found that in this way the condensed steam appears to effect a shielding action, so far as the inner surfaces of the iron portions of the plant are concerned, and the formation of iron sulphide is thus precluded. A second point to remember is that when shutting down the plant the steam should be permitted to blow through the system for some time after the liquor has been turned off from the still. In this way a thorough scavenging is effected, and no harmful products are left about to work their evil while the plant is off. Incidentally, it may be noted that when blue sulphate is found it is nearly always the product of the ordinary distillation plant, for it is a rare occurrence to find this type of discolouration in connection with the modern "direct" apparatus.

Factory and Workshop Reform

THE annual report of the Chief Inspector of Factories and Workshops for the past year has rather more interest than usual from the fact that it reviews the general experiences of the war period. The main feature of that period was the prominence given to safety, health, and welfare, including reduction in the hours of labour. Experience has shown that an increase in the ordinary hours of work does not necessarily mean an increase in production, that increased output follows increased attention to the comfort and welfare of the worker, and that attention to health and the prevention of accidents result in greater efficiency and reduced charges. Industrial organisation was radically affected by the exceptional demands made on works as the war developed, and for a time longer hours were worked. At first this was considered to be justified by the extreme urgency of the situation, but it was soon found that it would be impossible to maintain the desired output if they were continued.

The past year has especially been marked by a great advance in the voluntary movement on the part of employers and workers to reduce hours of labour, and individual works in a fairly wide range of industries have found it convenient to adopt a five-day week with no work on Saturday. The altered conditions of employment caused increased attention to be given to the question of safety. The increased amount of machinery used, together with the adoption of new types of machines, coupled with the increased number of persons (many of them unskilled or semi-skilled) employed in factories, and the introduction of female labour into processes hitherto confined to men, might have been expected to produce an increase in the number of accidents. On the contrary, many of the inspectors report a decrease, and this good result is attributed largely to the "Safety First" movement. Another interesting point in the report is that the urgent need of munitions and the substitution of women for men greatly stimulated the introduction of labour-saving appliances —a tendency which, in view of diminishing hours of work and demand for increased output, is bound to continue and, therefore, claims the attention of employers. It is one of the problems to which the Chemical Engineering Group is giving attention at a forthcoming conference.

Industrial Poisoning

IN the chapter of the Report on Industrial Poisoning (some extracts from which are published in this issue), Dr. Legge gives particulars of the work of the medical inspectors. While in some industries, owing to the shortage of raw materials and the reduction of the number of persons employed, there was a large decrease in the number of poisoning cases reported, in others the use of chemicals in the manufacture of munitions on the huge scale necessary to meet the needs of the fighting forces gave rise to sudden and unexpected outbreaks of illness in the early stages of the war. Two instances are especially noted.

In the manufacture of aeroplanes tetrachlorethane was used as an ingredient of the varnish or "dope" for covering the wings. Before the war the small and intermittent use of this substance had not been sufficient to direct attention to its injurious effects, but towards the end of 1914, when the manufacture of aircraft had greatly developed, mysterious outbreaks of illness appeared among the workers in the doping-rooms throughout the country. The symptoms, of which jaundice was a prominent one, were remarkably uniform. Investigations were at once made by the medical inspectors. Exhaust ventilation was found to be the most efficient means of preventing ill-effects, and ventilating plant was provided in all doping rooms with most satisfactory results. Meantime attention was directed to discovering a less injurious substance for the varnish. Acetone substitutes were tried with success and the use of tetrachlorethane was eventually discontinued. It is an interesting fact that the same trouble had been experienced in Germany, but in that country the outbreak of illness appeared in 1913.

The second instance was due to the use of trinitrotoluene, commonly known as T.N.T., in the manufacture of explosives. Before the war this substance was regarded as non-poisonous, and it was only its use on a large scale and its constant manipulation by workers that directed attention to its injurious effects. Jaundice was again noticed to be one of its most serious symptoms, and in order that all possible information should be obtained *toxic jaundice* was made notifiable under S. 73 of the Factory Act, 1901. The dust and fumes given off, especially in manipulation of the manufactured substance, were found to be the chief cause of

illness, and that the measures taken to deal with the trouble were eventually effective is shown by the fact that the number of cases of toxic jaundice which were 190 in 1917 fell to 34 in 1918.

Lessons from Leipzig

MOST people are prepared to credit the Germans with a capacity for dogged drudgery in facing difficulties, but reports concerning their industrial Fair, held at Leipzig last month, confirm our suspicion that their power of recovery is not quite so miraculous as we are sometimes asked to believe. Some 10,000 firms, mostly German, exhibited, there was an attendance of about 118,000 people, and the number of foreign buyers present is estimated at 7,000. The general impression, however, gathered from inquiries among German exhibitors is that German industry is in a very bad way, owing primarily to shortage of coal, and, secondly, to loss of export trade and the consequent inability to purchase foreign raw materials. While anxious to re-establish trading relations with England, the German trader recognises the hostility he is bound to meet with for some time, and there is a tendency to concentrate rather on America and the neutral nations by which Germany is surrounded.

As to the exhibits, there was nothing in them to indicate any rapid recovery of Germany's pre-eminence in industrial chemistry; the great feature of the technical section was the large show of new machine tools and mechanical devices and novelties. Much specialised new machinery, we learn, was seen, and in many cases the Germans seemed quite willing to part with the covering patents to foreign manufacturers. If the same conditions prevail at the Frankfurt Fair, this fact may be well worth the attention of British manufacturers. Although there was one very good exhibition of aluminium kitchen utensils, etc., it was stated that owing to the coal shortage, there are now not more than 400 tons per month of raw aluminium blocks produced out of a total output of 4,000 tons. Many substitutes requiring less coal for their manufacture were seen. These included clay and natural cement substitutes in lieu of Portland cement, which requires about half its own weight of coal for its manufacture, and artificial marble (from gypsum). The Fair, as a whole, showed that Germany is facing the situation with energy, but that its outlook is distinctly barren for a long time to come.

Dyestuffs Imports: A Simple Issue

THE letter we publish this week from the British Chemical Trade Association raises a clear and simple issue which it ought to be possible to decide without any delay. The Association state that the Dyestuffs Licensing Sub-Committee have refused to grant licences for the importation of malachite green crystals of American origin, and have stated as their reason for the refusal that they "understand this product is now available from British sources of supply." This, on the face of it, would seem to be a good reply, but the Association go on to state "that the Committee has ignored requests for information as to names of British manufacturers who can in fact supply" and that their correspondents have endeavoured without success to obtain supplies from three leading British firms. That the Association is taking this point up quite seriously is shown by the public invitation which they give in our columns this week to any British manufacturer who can supply to communicate with the Association in order that he may be put in touch with the members who are wanting the goods. If the facts are as stated an explanation certainly seems due from the Licensing Sub-Committee. If the Sub-Committee exclude any American or other products on the ground that home-produced British supplies are available it is surely up to them to inform inquirers where those British supplies may be obtained.

The Calendar

Oct. 11	North of England Institute of Mining. General Meeting of Members.	Wood Memorial Hall, Newcastle-on-Tyne.
14	Sheffield Association of Metallurgists and Metallurgical Chemists. "Fuel Economy in Steam Raising," by R. Howson.	Royal Victoria Hotel Assembly Room, Sheffield.
14	Manchester Municipal College of Technology. "Inherent Faults in Metallic Materials Used in the Construction of Chemical Plant," by E. L. Rhead, M.Sc.Tech.	
21	Sheffield Association of Metallurgists. General Discussion on Nickel-Chrome Steels, based on Iron and Steel Institute Papers Nos. 1, 6, and 11, September, 1919.	Royal Victoria Hotel Assembly Room, Sheffield.
21	Manchester Municipal College of Technology. "Site, Lay-out and Construction of Chemical Works," by J. Allan (Joseph Crosfield & Son, Ltd.).	
23	Society of Chemical Industry. Council Meeting, 2.30; General Meeting, 4.30.	Central House, Finsbury Square, E.C. 2.
28	Sheffield Association of Metallurgists and Metallurgical Chemists. "Some Microscopical Effects of Static and Dynamic Stresses," by G. R. Bolsover, Assoc. Met.	Royal Victoria Hotel Assembly Room, Sheffield.
28	Manchester Municipal College of Technology. "Site, Lay-out and Construction of Chemical Works," by J. Allan (Joseph Crosfield & Son, Ltd.).	
31	Chemical Industry Club. First Annual Dinner.	
Nov. 1	Institution of Automobile Engineers.	Royal Society of Arts, John Street, Adelphi, W.C.
4	Manchester Municipal College of Technology. "Paint Grinding," by W. H. Barnes (Follows & Bate, Ltd.).	
4	Sheffield Association of Metallurgists and Metallurgical Chemists. "Welding," by H. Brearley.	Royal Victoria Hotel Assembly Room, Sheffield.
7	Society of Chemical Industry. (*a*) The Estimation of P-Phenylene Diamine. By T. Callan, M.Sc., Ph.D., and J. A. R. Henderson, D.Sc. (*b*) The Estimation of Sulphuric Acid in the presence of Organic Sulphonic Acids. By T. Callan, M.Sc., Ph.D., J. A. R. Henderson, D.Sc., and R. Barton, Esq.	Grand Hotel, Manchester.

Potash Recovery at Cement Plants–(II).

By Alfred W. G. Wilson, Ph.D.

We give below the concluding part of the report by Dr. Alfred W. G. Wilson on the potash recovery equipments at cement works which he has been investigating in the United States.

(c) Water Film Treater.

The discovery that a considerable portion of the volatilised potash salts remained in the gases after the heavier dust particles had been removed, made it necessary to institute experiments to develop some type of treater which would recover as much of this potash as possible. The film type of treater was devised for this purpose. This treater is so designed that a thin film of water is maintained in constant flow down the faces of the collecting electrodes. In the form which was installed first at Security, each unit consists of eight sections. Each section consists of a vertical cell about 14 inches wide, 18 feet long, and about 20 feet high. The walls between sections are about 8 inches thick, the whole unit being a concrete monolith. A water trough is provided at the top of the treater, and is so constructed that each section is completely encircled. The circulating liquid is conducted to the trough through suitable pipes, from which it overflows down the walls of the cell. It is kept in circulation by a centrifugal pump. When the treater is in operation, water is discharged from the troughs over each of the four walls of the section, so that a thin film covers the whole surface. The circulating liquid is collected in a suitable chamber below the treater, and after suitable treatment to remove the sludge which may have collected, it returns to the pump. The wires for carrying the high tension current are suspended from a frame connected with the negative pole of the rectifier. In each section of the treater the high tension wires are suspended along the median plane, equi-spaced with respect to each other, and with respect to the adjacent walls. In operation, the gases are admitted at the bottom of the treater, and pass out through the top.

The second type of water film treater combines the features of the dry plate treater and the sectional water film treater. The median walls of the sections are retained, and suitable equipment is provided to discharge a uniform water film over the whole of their working surface. No end walls are provided on the sections. The wires carrying the high tension current are suspended along the median plane between the section walls. The stream of gases enters at one side of the treater, and is discharged at the other.

A dry treater of the plate type, as already noted, was first installed in the plant of the Riverside Portland Cement Co., at Riverside, California, to treat the flue gases from ten kilns. More recently, a pipe treater was installed to take care of the effluent gases from an installation of two additional kilns. Pipe-type, dry treaters, have also been installed at all the other cement mills but one using this system, as shown in the accompanying schedule. A water film treater of the open section kind, in which the gases enter and are discharged laterally, has been installed in the plant of the Newaygo Portland Cement Co., Newaygo, Michigan.

Combinations of these two types of electrical treater, operating in series, are also being tried out experimentally. At Security, the hot gases as they come from the kilns are first cooled by the admission of a certain quantity of air, and are then conducted through the pipe treater, where the greater portion of the dust particles are removed. From this treater they are conducted to the water film treater for final treatment before discharge into the atmosphere. In the plant of the Clinchfield Portland Cement Co., at Kingsport, Tenn., it is proposed to treat the gases in much the same way as at Security. The pipe treater has already been installed, but the water film treater, which is to be of the plate-type, with side adits and exits, has not yet been erected.

Spray Systems

The following classification has been evolved for convenience in describing the various spray systems for cleaning the gases to recover the potash salts by the use of sprays and circulating solutions.

In the simplest type, sprays are introduced directly into the flues, and a special chamber is provided in which the escaping vapours are trapped by means of special tile, suitably arranged in towers. A coke tower, or a quartz tower, could be used for the same purposes. In another type we find flue spraying followed by a special condenser, in which a portion of the water vapour is recovered, containing more or less of potash salts in solution, and, incidentally, the waste heat available from the condensation of the vapour is used for the evaporation of a portion of the saline liquors. The second group of spray systems employ special chambers in which the flue gases are subjected to treatment with sprays. Usually, the chambers are arranged in series, the gases being subjected to treatment in three or four units, arranged in series, one after the other, before they escape. One type of spray chamber has been evolved in which the escaping gases, after saturation with water, are filtered through specially designed filter beds made of excelsior.

Supplementary Operations

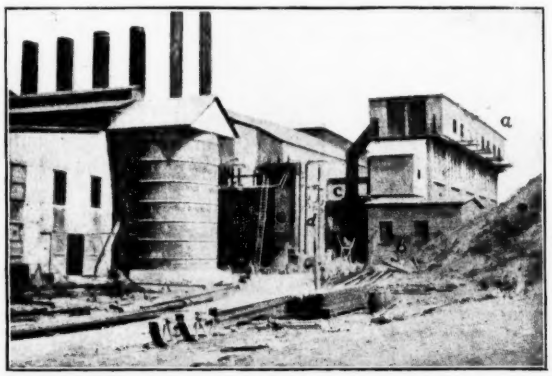
It is only under certain particularly favourable conditions that it is possible to market the flue dust containing the potash salts in the form in which it is collected through any one of the several types of the preliminary operations described above. It is usually necessary to subject the collected dust to some supplementary treatment for the purpose of concentrating the potash salts. It is obvious that these operations must be carried on in harmony with the other operations of the plant. Moreover, the flue gases from the cement kilns, escaping where the dry process is in use, are capable of supplying a considerable quantity of heat which can be recovered for utilisation if the proper equipment is provided. About 45 per cent. of the heat generated by the combustion of the fuel is lost through the flue gases.

A portion of the waste heat can be recovered through the installation of water tube boilers and preheaters. This is being done at the Cementon (New York) plant of the Alpha Portland Cement Co., where an electrical treater of the pipe type is in operation. A similar installation is in operation at Nazareth, at the plant of the Dexter Portland Cement Co. In both cases the boiler equipment is installed close to the kilns, and a high-speed fan has been placed in the system between the waste heat recovery equipment and the electrical treater.

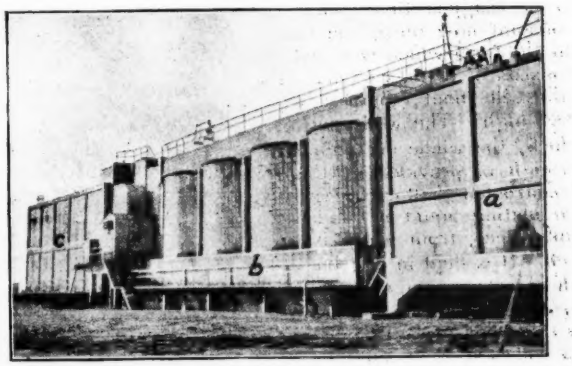
The waste heat in the flue gases can also be utilised for the purpose of evaporating the water from the saline solutions which are circulated in the spray systems, or which are specially prepared in the dry recovery systems. Where waste heat is used for evaporating purposes, we find that special pans are sometimes placed over the top of the flues, or they may be so constructed that the bottom projects downward into the flue.

Saline solutions are prepared in the plants where dry dust is collected, by mixing the dust with water at a suitable temperature, usually about 85° C. The digestion operations are carried on in special tanks, and when completed, the liquors are drawn over into settling tanks, where the solids are permitted to settle, and the liquor is removed in a suitable manner. In the water spray systems, occasionally some of the dry dust which collects in the flue between the kilns and the first spray chamber is subjected to digestion treatment in hot water. After settling, the liquor is drawn off, and joins the liquor from the spray system. In both cases, the liquors to be evaporated, after final treatment in settling tanks, are passed through a filter, both Oliver and American filters being used for this purpose. It has been found that a saturation of about 3½ per cent. soluble potash salts is the most satisfactory for the spray systems. If the percentage of potash salts present is permitted to become much higher than this, a proportion of the salt is likely to remain in the spray chamber. In plants where there is no liquor circulating system for spraying purposes, and where the only liquors to be treated are those made through the treatment of the dry dust, the soluble potash content of the liquor may be somewhat higher. After filtration, the liquors are collected in storage tanks, from whence they are conducted to the evaporating pans.

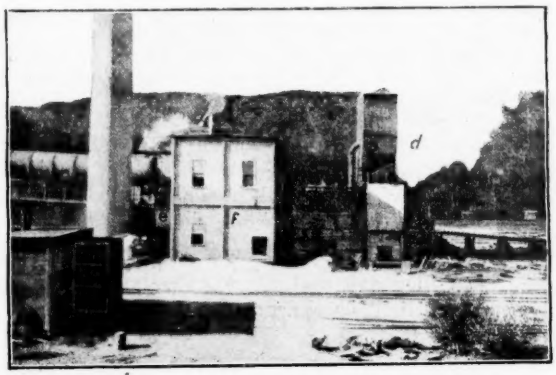
The final stages of the evaporation operation are sometimes carried on in separate equipment, with an independent source of heat. In some cases direct-fired pans are used for this purpose, in other cases specially constructed evaporators are utilised, to which the heat is supplied by the use of steam coils, and a special boiler. In the latter case, crystallising pans are also used.



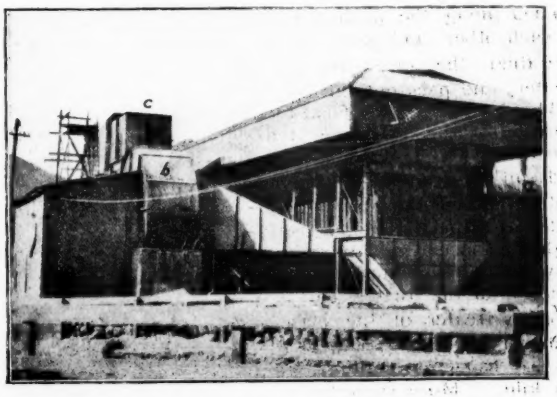
1.—Electrical Treater, reinforced concrete construction: (*a*) electrical treater, dry process; (*b*) generator-transformer building; (*c*) flues and breechings; (*d*) waste heat boilers; (*e*) steel flue.



2.—Treating Plant, employing Spray System, reinforced concrete construction: (*a*) distributing chamber; (*b*) saturator (the block construction); (*c*) condenser.



3.—Spray Treater and Condenser; reinforced concrete construction: (*a*) spray chambers; (*b*) evaporator condenser; (*c*) conduit leading to exhaust pipe; (*d*) fan housing; (*e*) flue leading to treater; (*f*) burner building; (*g*) main flue.



4.—Pipe Type Dry Electrical Treater: (*a*) steel flue; (*b*) fan housing; (*c*) discharge stack.

Costs of Potash Recovery

It is not possible to furnish any very close general estimate of the cost of installing or operating potash recovery equipment at a cement mill. It is obvious that the cost of installation will vary according to local conditions, the type of construction employed, and the particular process selected. With the exception of the installations at Riverside and Colton, California, the several plants mentioned in previous paragraphs were built under war-time conditions, and were to a considerable extent experimental. The costs of construction and development in pioneer work naturally were higher than they would be under normal conditions.

Equipment Costs.

A complete potash recovery plant, using the dry electrical precipitation method, would probably cost about $30 per barrel of daily cement capacity, if constructed largely of reinforced concrete, or concrete and tile brick. If all steel construction, the cost would be about double. A water film treater would cost in the neighbourhood of $25 per barrel of daily cement capacity.

A complete potash recovery plant, using one of the water spray systems, would cost from $30 to about $50 per barrel

of daily cement capacity. The efficiency of this type of apparatus is higher, hence the cost of the plant, on the basis of the potash recovered, would be lower.

A leaching and evaporating plant to produce concentrated salts for shipping would cost in the neighbourhood of $25,000, if designed to treat the dry dust from a 3,000 barrel mill. If this plant were designed and constructed in connection with a treater where saline solutions are circulated as part of the system for recovering the potash, the cost of such additional equipment as would then be required would be less.

In designing a potash recovery plant, it is to be noted further, that normally about 45 per cent. of the heat generated by the combustion of the fuel used is lost with the flue gases and dust. Under favourable circumstances, a portion of this heat can be converted into power by the use of water tube boilers, super-heaters, and pre-heaters. The heat car also be utilised to evaporate the excess liquor from saline solutions. It would, therefore, seem to be expedient to design by-product recovery equipment in such a way as to utilise the waste heat as well as to recover the potash in a form most suitable for merchandising.

Operating Costs.

The operating cost at the plant of the Security Cement and Lime Co. in 1917 is given by John J. Porter, the manager, as follows:—

		Per bbl. clinker.
Labour	$27 per day	= $0.0090
Power	25 ,, ,,	= 0.0083
Repairs	8 ,, ,,	= 0.0027
Laboratory	120 ,, month	= 0.0014
Total		$0.0434

The cost of the salt addition was $0.0220 per barrel of clinker. The capacity of this plant is 3,000 barrels per day.

R. K. Meade has published the following estimates for a 3,000 barrel plant using a dry electrical treater:—

	Per day.
Labour and superintendence	$25
Power at 1c. per k.w.h.	13
Repairs	10
	$48

The addition of salt to the mix is stated to represent an additional cost of $70 or $0.025 per bbl. of capacity. The production of concentrated salts would entail an additional expenditure of $8 to $10 per day for labour, and $15 to $25 for power, and evaporating excess water. The latter expense can be reduced or eliminated by utilisation of waste heat from the kilns.

Meade thus estimates the cost of operating a wet treater, applicable either to the water film electrical precipitator or to a spray system:—

	Per day.
Labour	$35
Power at 1c. per k.w.h.	25
Repairs	5
Fuel and evaporation	15
	$80

If salt is added, the additional expense would be $70 per day, or 0.025 cents per barrel of capacity.

In estimating the costs of production for any given cement plant the potash recovery plant should be credited with the value of the leached dust returned to the raw mix as slurry; and with the saving of coal that is almost sure to result with the installation of fans, whereby the draft on the kilns and the cement burning can be more closely regulated. Porter states that at Security the fuel consumption for five months in 1916, before the installation of the potash plant, averaged 96.4 pounds of coal per barrel; while for five months in 1917, with the potash plant, it averaged 87.0 pounds per barrel.

It might also be well to draw attention to the fact that the installation of potash recovery equipment does not involve any changes in the process of cement manufacture, and does not injure the product. On the contrary, the maintenance of more uniform burning conditions in the kilns under forced draft is likely to result in a more uniform product.

Conclusions

The problem of by-product recovery is one which should receive the serious attention of all Canadian cement manufacturers. It is obvious that the mill which can produce cement at the lowest cost will be in the most favourable position with respect to competitive business. All credits obtained from by-products, after allowing for amortisation and cost of operating recovery equipment, can be applied to the reduction of the cost of cement manufacture. The ability to produce cement at a price per barrel only a few cents lower than a competitor might often be the means of securing valuable contracts. Where standard prices prevail slight differences in cost per barrel may add very considerable sums to the legitimate profits of the business during a year's operations.

While this report deals primarily with the subject of potash recovery, attention may also be turned in certain other directions in which economies can be effected.

Cement mill dust is very frequently a cause of trouble with the owners of adjacent properties, particularly in agricultural districts. It is also injurious to the workers in the mills. Anything that can be done to reduce the dust nuisance is therefore advantageous to both the mill owner, to his employees, and to his neighbours. All recovered dust can be returned to the cement mix. Its value represents a credit for the recovery plant, while the cost of recovery is a legitimate charge against cement manufacture in those mills where it is compulsory to prevent the escape of dust.

Fuel is one of the principal items of cost in operating a cement plant, and power costs are of equal importance. Many Canadian cement mills utilise imported fuels. It therefore appears desirable to reduce fuel costs to a minimum by utilising the heat produced by fuel combustion as completely as possible. Those cement mills which are operating on the dry burning process may find it materially to their advantage to instal waste heat recovery equipment for the purpose of reducing their power costs.

Potash recovery, fuel economy, elimination of the dust nuisance, reduction of power costs, and more complete utilisation of waste heat, with the consequent reduction of coal consumption and coal imports, are all closely related problems that merit careful study.

Books Received

Chemical Calculation Tables for Laboratory Use. By Horace L. Wells, Professor of Analytical Chemistry and Metallurgy in the Sheffield Scientific School of Yale University. Second Edition, revised, with a double thumb-indexed logarithm table. London: Chapman & Hall, Ltd. Pp. 43. 6s. 6d.

The Chemistry of Colloids. Part I—Kolloidchemie. By Richard Zsigmondy, Professor at the University at Göttingen, Director of the Institute of Inorganic Chemistry. Translated by Ellwood B. Spear, Associate Professor of Inorganic Chemistry, Massachusetts Institute of Technology. Part II—Industrial Colloidal Chemistry. By Ellwood B. Spear, B.A., Ph.D. A Chapter on Colloidal Chemistry and Sanitation. By John Foote Norton, S.B., Ph.D. Assistant Professor of Chemistry of Sanitation, Massachusetts Institute of Technology. London: Chapman & Hall, Ltd. Pp. 288. 13s. 6d.

Industrial Poisoning in British Works

Report for the Past Year

The Annual Report of the Chief Inspector of Factories and Workshops for 1918 contains a chapter by Dr. T. M. Legge, Medical Inspector of Factories, on "Industrial Poisoning," from which the following extracts are taken.

Lead Poisoning

THE principal factor is whether or not locally applied exhaust ventilation for the removal of dust and fumes is practicable. If it can be applied, great improvement is possible; if it cannot, there will either be an increase in the cases of poisoning or the numbers will remain stationary. This is borne out by the figures for 1915 to 1918, but they have during this period been considerably affected by other circumstances. The calling up of men led to the increased employment of women in lead industries. Lead usually takes several months or years to show its effects, and there has been no increase in the number of women reported as suffering. This may be due to the fact that they had not worked long enough, but it may equally be true that the greater precautions taken in the removal of lead dust by exhaust ventilation have made the processes in which they were employed much safer than they used to be.

From an early date in the war lead was controlled by the Ministry of Munitions. On its use for Government work, including smelting, conversion into shrapnel, the manufacture of electric accumulators, sheet lead and lead piping required for the manufacture of acids, &c., no limits were placed, but wherever private orders were in question the supply was restricted. Of the total 147 cases, 32 were contracted in the extraction of spelter. The comparatively very high figures for plumbing and soldering were undoubtedly due to the great amount of lead burning required in erecting acid chambers, vats, &c , in large munition factories. The conditions under which the men engaged had to carry on their work, exposed to acid fumes and other defective conditions, were often trying. The actual handling of lead is rarely shown to be a cause of lead poisoning. Among the ten cases reported, only two or three occurred among women out of the large number who were employed looking over bullets.

Sustained effort will be required to prevent as far as possible the cases of lead poisoning from increasing again in peace time. It can be taken as axiomatic that all risk lies in inhalation of dust and fume. These removed or prevented, there will be no lead poisoning. At the same time, none of the subsidiary means for minimising effects of lead can be neglected.

Phosphorus Poisoning

"Phossy jaw" underwent recrudescence in 1915-1918, during which time eleven cases were reported from the one factory in which the manufacture of phosphorus is carried on. Until these cases, an apparent immunity, extending over many years, had been enjoyed. Although the number of individual workers brought into contact with phosphorus for one and another war purpose has been considerable, only one case has been reported in processes other than the manufacture. With this exception, all had worked for years in phosphorus processes. In the factory in question, examination of the dental condition by a surgeon and reference by him to a dentist of those whom he considered needed treatment had been relied on in past years, instead of examination by a dentist in the first instance, which would, in my opinion, have been the wiser course. After the first case (which proved fatal) in 1914, the firm engaged the services of a dentist, with the intention, since carried out, of putting the teeth of all those coming into contact with phosphorus into a sound condition, and linking up the work of the dentist with that of a consulting surgeon of the highest standing in case of need. The dentist attends two afternoons a week in the well-equipped dental surgery on the works, and quarterly examination of all the workers has been arranged for.

Arsenic Poisoning

The increase of reported cases from three in 1915 to thirty in 1917 was due partly to the increased number of cases (nine) from arseniuretted hydrogen gas poisoning, but mainly from the manufacture (for purposes of chemical warfare) of arsenic trichloride by the action of sulphuric acid on a mixture of common salt and arsenic, from whence it distilled over and was condensed as an oily liquid and filled into drums. The plant was difficult to keep free from leaks, and the arsenic chloride permeated the air near the place where the men were working. The effect was to produce an intense irritation, showing itself in eczematous ulceration of the face, nose, hands, and other parts of the body to which the vapour might gain access, especially those parts liable to excessive sweating. The mucous membrane of the eyes, nose, throat, and bronchial tubes was attacked in the same way. Two other cases of ulceration of the skin occurred in men who were manipulating sludge containing arsenic from acid coolers in the manufacture of sulphuric acid.

Poisoning by Arseniuretted Hydrogen

Prior to the year 1914 poisoning by arseniuretted hydrogen gas occurred chiefly in the manufacture of salts of zinc and in chemical works among workmen engaged in removing acid residue from tanks or stills by means of galvanised iron pails and metal shovels. Cases of a similar character have continued to be reported, and during the years 1914-1918 the following industries were concerned:—

Oil works, cleaning out tanks, two cases (one fatal)
Chemical works, cleaning out tanks, four cases (two fatal).
Chemical works, manufacture of zinc salts, two cases (one fatal).
Chemical works, zinc purification process, two cases (one fatal).
Brass foundry, bronzing of art metal, two cases.

During the years 1917 and 1918 increase in the manufacture of intermediate dyestuffs has led to a series of other cases, five in number, with two deaths; and the probable extension of this industry adds to their importance. The processes implicated have been those in which zinc dust and hydrochloric acid are used, either together in a reduction process or the acid added, at a later stage in the manufacture, as a solvent for the zinc hydrate, formed at the previous stage, and any unconverted metallic zinc. When the first cases were investigated question arose as to the possibility of hydrogen being liberated from an alkaline solution, but subsequent investigation proved this beyond doubt. The occurrence of these cases of arseniuretted hydrogen poisoning has been due, in some measure, to the high arsenic contents of the acid used during these years. One of the fatal cases occurred on a plant (zinc purification) which had been in operation for twenty years.

The risk of poisoning may in the future be minimised by the use of de-arsenicated acid, but the presence of arsenic in the metal still necessitates the greatest care being exercised in any manufacture where hydrogen gas is liberated in the presence of arsenic. The cases investigated show that even when a process is carried on in the open there is danger to the workmen, or where an exhaust draught is provided for the vessel in which the reaction takes place this precaution may, under certain circumstances, be insufficient to protect the workers.

Mercurial Poisoning

The figures for mercurial poisoning show an increase in the years 1916 and 1917—caused by the greatly increased use of fulminate of mercury in filling detonators. Only a few of the cases from this cause, however, show the recognised symptoms of mercurial absorption—salivation, tremor, and "nervousness." The finer the powder, the more irritating it is to the eyes and nostrils. The condition is very quickly set up, the reports on the cases frequently showing as short a time of employment as two or three weeks. The cases are but samples, and there must be few who come in contact with the fine powder who do not suffer more or less from its effects. Unfortunately, the highly explosive nature of the substance renders it quite impracticable to require mechanical means of ventilation, and, indeed, operations have to be conducted so carefully that no dust is visible. Use of a 10 per cent. solution of sodium hyposulphite (1 lb to a gallon of water) aids in the prevention of the ulcers and rash, and the workpeople were directed to dip their hands in a basin containing the hyposulphite solution before breakfast, dinner, and leaving at night.

The distribution of the 208 cases of mercurial poisoning between May, 1899, when mercurial poisoning first became notifiable, and December last, is as follows:—Thermometers, 45; fulminate in powder factories, 54; hatters' furriers, 27; electrical meters, 24; felt hat industry, 19; chemical works, 19; water gilding, 12; lining sweet moulds, 4; mercury lamps, 3; bronzing, 3; card dressing, 3; photo-engraving, 2; other, 2.

Attention was called to the risk of mercurial poisoning in the manufacture of cyanide gauze dressings and bandages, owing to the dust given off as the material is lapped. In one factory periodic medical examination was instituted in the execution of a large order.

Toxic Jaundice

In November, 1915, toxic jaundice, occurring in a factory or workshop and due to tetrachlorethane or nitro or amido derivatives of benzine or other poisonous substance, was added to the list of diseases in Section 73 of the Factory and Workshop Act, 1901, of which notification is obligatory on medical practitioners and occupiers. The effects of tetrachlorethane when used as a dope in the manufacture of aeroplanes, and the high standard of ventilation which it was felt necessary to maintain even after the elimination of tetrachlorethane from the dope, have been described in detail in previous Reports. This high standard was necessary in consequence of the continued use of benzol and acetone substitutes. In one factory where, owing to pressure of work, certain women had to carry on doping of the ordinary kind in a room provided only with natural means for ventilation, in a short time medical aid had to be summoned in consequence of symptoms of intoxication in some of them. The cases due to T.N.T. in the last three years were:—1916, 181; 1917, 189; 1918, 34.

Poisoning by Dinitrophenol

In the French shell-filling factories T.N.T. was not used to the same extent that it was in this country, being replaced by a mixture of picric acid and dinitrophenol. Experience in France showed in the first two years of the war that D.N.P. was highly toxic in the absence of care and cleanliness. By August, 1916, twenty-seven deaths had occurred in seven factories using it, of which seventeen occurred in weighing out the compound and melting it, eight in the process of hydro-extracting, one in stoving, and one in conditioning. In addition, numerous slight cases were treated. The health conditions and chemical reactions of the compound in the body were carefully investigated, and the preventive measures adopted in France included close medical supervision of the workers by a daily visit from a surgeon. When it became necessary in this country in 1918 to use D.N.P. in two factories, the late Lieut.-Colonel O'Reilly visited the principal factories in France, and, as a result of his advice, very complete safeguards were established. The men employed were provided with a complete set of underclothing and overalls, into which they changed from their working clothes in a separate cubicle provided for each man. Locally applied exhaust ventilation of very perfect design was applied in the melting of the compound, to take away the fumes, and in the filling of the 12-inch shells. Any dust that collected around the margin of the shell was removed by a vacuum cleaner. The washing and bathroom facilities were all that could be desired. As a result of these measures no trouble of any kind was experienced in the use of D.N.P. One fatal case, with typical symptoms, occurred in this country in 1916 in a factory where it was made.

Fumes and Gases

Below is a statement of the number of cases in 1917 and 1918 reported as accidents due to escape of gas, and for comparison those in 1913 and 1914:—

	1913	1914	1917	1918
Carbon monoxide	59	62	99	54
(*a*) Blast furnace	20	20	22	17
(*b*) Power	21	21	32	21
(*c*) Coal	9	7	20	10
(*d*) Other	0	14	25	6
Carbon dioxide	12	3	1	5
Sulphuretted hydrogen	8	22	11	7
Sulphur dioxide	1	1	2	1
Chlorine	1	2	3	4
Nitrous fumes	—	9	62	27
Ammonia	3	4	4	6
Benzol, naphtha, and petrol ...	6	4	4	7
Tetrachlorethane	—	25	—	—
Ether, acetone	—	—	4	1

Carbon Dioxide Poisoning.—Cases due to this source, though few in number, are nearly always fatal. One of the fatal cases occurred in a brewing vat. Five fatal cases occurred in the removal of grain from the hold of ships, and of these three were men attempting to rescue a comrade. Over 200 years ago Ramazzini remarked that "after wheat had been kept long in a close space it throws out such a noxious exhalation as is enough to kill anyone that offers to set his foot within the place till the door has stood open for some time to let out the pernicious air."

Nitrous Fumes.—A large number of cases, which must, however, only represent a small proportion of the actual number that occurred, arose directly out of the war in the manufacture of nitric acid and the subsequent nitration processes in the manufacture of explosives. In 1918 the cases had fallen largely as compared with 1917, when not less than twenty-two arose in the nitric acid plant, and twenty-five, with five deaths, in the manufacture of picric acid, tetryl or tri-nitro-toluene; ten were due to nitrating guncotton; four, with one death, to the bursting of carboys containing nitric acid; and three, with one death, to amalgamating with mercury the lead interior of three new pre-wash tanks, the solution used being mercuric nitrate. Nitrous fumes enveloping a workman for a period of one or two minutes leads to intense constriction in the throat, violent respiratory efforts are made, and the man becomes more or less collapsed. Exposure for more than two minutes will cause asphyxiation and death. Exposed for from one-half to nearly two minutes the men rapidly recover on returning to the open air, and soon feel as if the danger had passed. These are the cases in which, some hours later, distress is felt, and often terminate fatally with œdema of the lungs. Workers daily experiencing small escapes of nitrous fumes frequently have coughs, with relaxed throat and chronic bronchitis. Early in the war a memorandum and placard on the precautionary measures to guard against nitrous fumes in the acid plant and nitrating sheds, as to the use of air helmets, use of oxygen cylinder, artificial breathing, and treatment in cases of gassing by nitrous fumes, was circulated to occupiers of existing plants, and those in course of erection for the manufacture of picric acid, T.N T. tetryl, and the like.

Chronic Benzol Poisoning

In January, 1918, two cases of purpura hæmorrhagica were brought to the notice of the Factory Department by Dr. Veitch, of Edinburgh. The illness affected two men employed in a large rubber works as rubber spreaders; one case was reported as already having proved fatal; the other as being seriously ill in hospital. These are the first cases of chronic benzol poisoning known to have occurred in this country.

Investigation by Dr. Bridge of the cases reported showed that the two men were employed in rubber works spreading balloon fabric. The firm's chemist made determinations of the amount of benzol in parts per 10,000 of air at different places in the spreading room. From these data Mr. Stevenson Taylor calculated that in a spreading room with a capacity of 55,000 cubic feet and containing ten spreading tables for prooling balloon fabric, 15.33 cubic feet of benzol vapour will be produced per minute. Hence, with thirty changes of air per hour, assuming uniform diffusion of the vapour, the atmosphere in the room would contain .055 per cent. (*i.e.*, 5.5 parts in 10,000) by volume of the vapour. This amount is well below the lower explosive limit for mixtures of benzol vapour and air, which is three parts of benzol vapour and ninety-seven parts of air, the upper explosive limit being six parts of benzol vapour and ninety-four parts of air.

In view of the dangers disclosed the alternatives were either to stop the use of benzol or to increase the ventilation of the rooms in which it was to be used, so as to reduce the percentage of benzol in the air below a toxic limit. The experience gained in the ventilation of dope rooms encouraged belief that the same method of dealing with rooms in which benzol was being used would prove effective, and it was on these lines the Factory Department proceeded. Alternatives to benzol were also considered. Inquiry was undertaken on this point by Dr. H. H. Dale and Miss F. M. Durham, of the Medical Research Committee, into the toxicity of a mixture known technically as "xylol compound," which was capable of being supplied in large quantities by the Asiatic Petroleum Co. The point referred was whether it could be used safely as a rubber solvent. Dr. Dale reported that "from the practical point of view it seems that the xylol compound could be used as a rubber solvent with, at any rate, very much less danger of causing aplastic anæmia and purpura than benzene."

Ether Intoxication.—Several cases of ether intoxication occurred in the manufacture of cordite with a mixture of ether and alcohol,

which was used as a solvent instead of acetone. In nearly all the cases the effects were transitory.

Gases used in Chemical Warfare.—The manufacture of poison gas was carried on under the control of the Trench Warfare Department of the Ministry of Munitions, the work on the medical side being under the supervision of Dr. F. Shufflebotham. The whole subject of irritant gases used in the war was under the direction of the War Office, and in January, 1918, the Director-General of the Army Medical Service, with the concurrence of the Controller of the Chemical Warfare Department, Ministry of Munitions, appointed a special committee to prepare reports, based upon information received from all sources, for submission to him, with a view to their distribution to those concerned, to make suggestions for further co-ordinated medical investigations, and to advise generally in respect of the scientific medical aspects of chemical warfare. From two factories in which phosgene ($COCl_2$) was manufactured twenty-seven cases were reported in 1917 and sixty-nine in 1918. With the manufacture and filling of shells with mustard gas (dichlor-diethyl sulphide) incidence became fast and furious. In the six months between the middle of June and December, 1918, some 1,400 attacks in the manufacture of this gas occurred, the actual number of workers suffering being about 700, some of whom had three or four attacks. From another factory where filling was done, some ninety-seven cases were reported during that time. The manufacture had to be carried on before the works were fully prepared, under trying conditions for the workers. Among the 1,400 cases referred to are included blisters on every part of the body (except the palms of the hands), conjunctivitis, bronchitis, &c., and chronic effects of debility, cough, gastric pain, and breathlessness. There were three deaths. In time efficient medical control was exercised in both factories, and every effort made to try and combat the very penetrating effects.

Notes on Chilean Nitrate

By Frederick Gronback

RECENT official reports on the Chilean nitrate industry show that the nitrate fields comprise nearly 200,000 square kilometers, of which only 5,811, or less than 3 per cent., have thus far been surveyed and their contents ascertained. The estimated contents of the unsurveyed area were 290,300,000 tons of nitrate, of which probably some 50,000,000 tons have been extracted, leaving in the present unsurveyed portion 240,300,000 tons, equal at the present rate of production to a supply for one hundred years. As the unexplored portion is some thirty-four times larger than the ground explored, it is safe to assume that it contains at least twice the quantity of nitrate. Consequently the Chilean nitrate zone can certainly provide a supply for another three hundred years, if indeed it may not be considered inexhaustible.

These interesting facts, together with a review of the Chilean nitrate industry, are published in the "Grace Log" of W. R. Grace & Co., an important American enterprise. During the last pre-war period the total exports were 59,529,110, compared with 60,354,975 quintals in 1917.

Formation of Nitrate Beds

The first stratum of the nitrate beds, *chuca*, with which the ground is usually covered, is formed by the decomposition of porphyry; the second, *costra*, a rocky conglomeration of clay, gravel, porphyry and feldspar, cemented together with sulphate of potash, sulphate of calcium, and nitrate of soda (this stratum is very hard and difficult to remove without the aid of explosives); and the third, *tapa*, comprises sand, clay, common salt and sulphate of calcium.

The crude nitrate, or *caliche*, is usually found at a depth of 2 to 6 ft. The best *caliche* contains from 40 to 70 per cent. of nitrate, the medium grade from 30 to 40 per cent., and the third grade from 18 to 30 per cent. Material containing less than 13 per cent. is not considered worth working at present, but experimental work and improved methods of extraction are constantly being carried out and tested to enable the lower grades to be profitably worked.

A considerable amount of complicated machinery and a close degree of accuracy are required in the process of manufacture, which is briefly as follows:—The *caliche* is dropped into funnel-shaped trucks, which run on rails to the boiling department. After cooling off the solution, precipitation and crystallisation of the sodium chloride and the nitrate follows. The temperature of the solution is reduced to that of the atmosphere, which takes 24 to 40 hours or more, the nitrate crystallising on the walls and bottom of the vats. The mother liquor from the vats is pumped off, and the nitrate collected for drying. Iodine is extracted from the mother liquor. The crystallised nitrate is placed on dry pans for three or four days to allow water to drain off, and is then taken to the *cancha*, or dry floor, where it remains until perfectly dry: it is then packed in bags containing about 200 lb., and sent by rail to the port of embarkation. Common 95 per cent. nitrate is used for fertiliser purposes, while 96 per cent., or refined nitrate, is applied to manufacturing uses.

Number of Establishments

Nitrate establishments are known under the comprehensive name of *oficina*, of which there were 167 before the war. The war completely disorganised the industry, and by the end of 1915 there were only 34, and production, which averaged 5,000,000 quintals per month, dropped to 2,000,000. The scarcity of tonnage affected transport and led to very large increases in freight rates. The ultimate effect, however, has not been as disastrous as might have been anticipated, for the use of nitrate in the manufacture of munitions brought about an increased demand.

About 50,000 men are employed in the industry, and the various *oficinas* are in direct rail communication with the ports. There are about 1,000 miles of line, carrying each year 3,000,000 tons of freight and 750,000 passengers. Coal, which at one time was the only combustible used, was brought from England, but now of the fuel used in the manufacture of nitrate 80 per cent. is oil.

As an indication of increased production and price the following comparative figures are given:—

1889.	Production 20,682,000 quintals.	Average price,	5s. 2½d.
1913	,, 60,266,395 ,,	,,	7s. 11d.

The Grace Nitrate Company, incorporated in 1916, purchased properties from the Tarapaca & Tocopilla Nitrate Co., Ld., representing an immense transaction. The *oficina*, or production centre, a thoroughly up-to-date property, possesses new plant with all modern methods. Its output is 4,000 tons per month, and when extensive alterations are completed the output will reach 6,000 tons. This will be the first *oficina* to instal the new filter process, which is expected to show results in economy of manufacture. It employs 1,000 men, and the whole production will be shipped to the U.S.A.

Government Aid for Research

THE British Association of Research for the cocoa, chocolate, sugar, confectionery, and jam trades has been formed in accordance with the Government scheme for the encouragement of industrial research. The association will establish and maintain laboratories and conduct experiments, and powers are also taken to encourage the technical education of persons engaged or likely to be engaged in the allied trades. The Government will contribute, within certain limits, out of the funds of the Imperial Trust for the encouragement of scientific and industrial research a sum equal to that subscribed by the members themselves for five years. It is stated that the drawing up of a provisional programme of highly profitable research work presents no difficulty, as raw materials, sugar, glucose, gelatine, fruit preservation, milk, and many more articles offer useful fields of inquiry. Some time must elapse before any considerable results can be obtained from research work, but no time is to be lost in establishing at the offices of the association an information bureau to which any member of the association can apply for assistance in technical and other difficulties.

THE COAL CONTROLLER announces that there is no foundation for the report that the Government has purchased 100,000 tons of coal per month from the United States with which to supply the depots at ports of call. Neither the Coal Controller's Department, the Admiralty, nor any other Government Department is buying any American coal.

Alsatian Potash Mines.

Much has been heard of late about Alsatian potash, and the following notes on the Alsatian mines, supplied by a correspondent with a long experience of their working, will be of interest. Now that the mines are free from the control of the German syndicate and industrial peace has come, the output should be continuous and increasing.

THE Alsatian potash mines, which, with the exception of those found in Germany and known as the Stassfurt potash deposits, are the only ones of any consequence in the world, are situated in the region of Mulhouse, Cernay, and Soultz. The potash deposits are in two strata. The lower layer is the more important, and is of an average thickness of from 12 to 16 feet. Above the upper stratum is a layer of rock salt, intermingled with clay and shale, and between the two strata the same materials are to be found. These hard layers of clay and shale are of considerable value, as they form hard and watertight roofs for the workings or saps.

The mining of the potash salts is a comparatively simple operation; the most difficult part is the sinking of the shaft, as it is imperative that no water should enter the mines. It is consequently necessary to line the shafts with cement or sheet-iron casings, in order to render them watertight. It is absolutely essential that water should be kept out of the mines, otherwise they may be ruined owing to the very soluble nature of the salts.

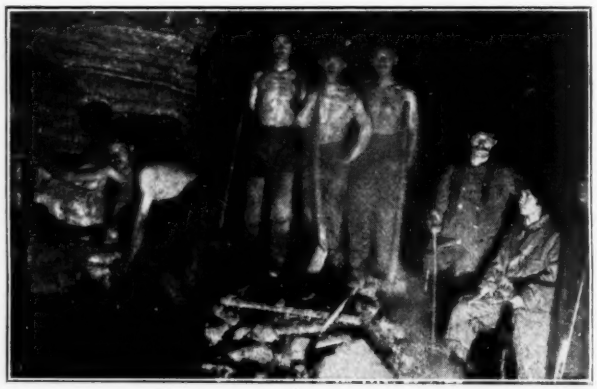
The shafts are sunk to a depth of from 1,500 to 3,000 feet, according to the position of the potash beds. From the bottom of the shaft, galleries are pushed right through the strata, and these form the main arteries of the mines, along which trolley lines are run, and electric cables are laid to supply power for the workings. As a rule, both potash beds are worked simultaneously, the upper slightly in advance, in order that no interference may be caused by the depression of the roof in the lower workings. The saps branch off from the main gallery, and here the potash is worked. Each sap or working produces about 50 tons of salts per day. Thus mines having five saps working simultaneously produce 250 tons of potash salts per day.

Holes are drilled into the salt by means of electrically driven drills, for which operation two men are required. Explosives are then placed in the holes and exploded. From each blast falls of several tons of salts are secured. The material is then broken into pieces of suitable size and loaded on to trolleys, which are then man-handled to the main gallery, and are there hitched on to an electrical train or endless cable, which conveys them to the bottom of the shaft. The trolleys are then taken to the surface in a double-elevator cage.

The saps are of considerable height, and are worked into large excavation rooms of about 40 feet in length, with solid pillars of salt between, to give support to the roof. The roof of the excavation is quite firm, and little or no mechanical support is required, but a number of the saps are riveted with common salt, most of which is obtained from the concentration factory.

The air in the mines is very dry, and in spite of the good system of ventilation, the temperature in many of the workings is very high. When the trolleys reach the top of the shaft they are run along to the crushing factory, and are tipped into hoppers which feed the crushing mills.

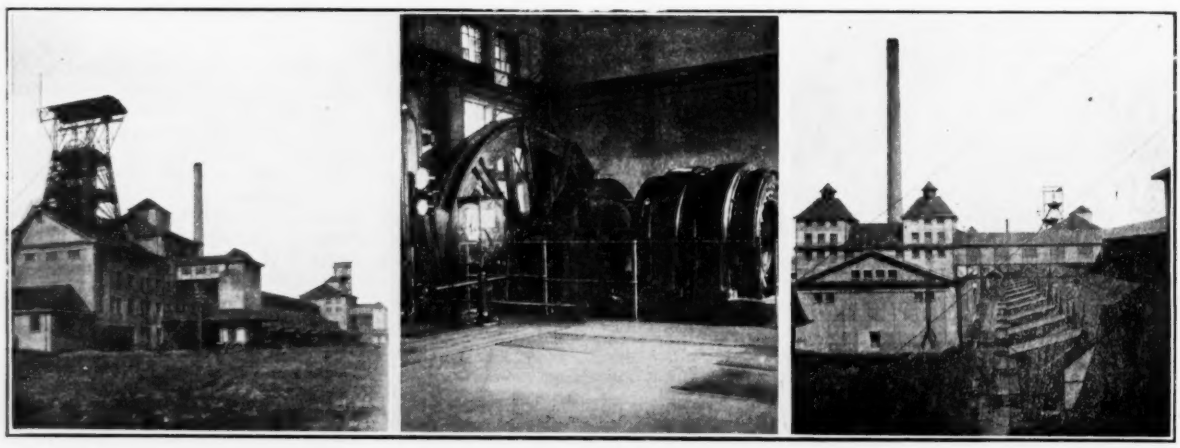
The mineral passes through the crushers, and is made into fine powder or coarse granular material as is required. The



POTASH MINERS AT WORK

Sylvinite (French kainit) 14 to 16 per cent. K_2O and the Sylvinite (French manure salts) 20 to 22 per cent. K_2O are loaded directly into trucks from the crushers as they are ready for distribution. About 3,500 tons of these salts are now being produced daily by the Alsatian potash mines.

The salts which are to be refined are conveyed to the refining or concentrating factories by means of a belt conveyor. At the refining factory the powdered mineral, which is usually the 20 per cent. salt, is tipped into a tank containing a hot saturated solution of common salt. The temperature in the solution tank is maintained by steam-heated coils. From these tanks this solution is run into crystallising vats. The insoluble matter and the sodium chloride settle to the bottom, and the chloride of potash crystallises in the upper part of the vat. The remaining solution, which contains sodium chloride and small traces of magnesium salts



GENERAL VIEWS OF THE AMÉLIE MINE PLANT

which are found in potash salts, is returned to the solution tank.

Chloride of potash is raked out by hand on to a conveyor which carries it to the drying oven, and here it is dried and made ready for use by means of hot gases. At the present time 250 tons of this high-grade salt chloride of potash are being produced daily.

Not all of the mines have their own power installation, and part of the power used is drawn from a large electrical power station which is situated near Bâle.

A New Alkaloid

THE chemists of the United States Department of Agriculture, in conjunction with the Bureau of Plant Industry, claim to have extracted a new alkaloid from the plant called in Mexico "Gobernadora," the "Covillea tridentata" of botanists, which grows in the semi-arid districts of Mexico. The odorous characteristics and medical properties of this plant have long been known to natives and explorers, but it is only just recently that the presence of a new alkaloid has been recognised. The possibilities of this alkaloid in chemical and pharmaceutical preparations are now being ascertained.

"Gobernadora" is a shrub which grows in vast quantities in the States of Zacatecas, San Luis Potosi, Coahuila and Durango a little north of the Tropic of Cancer, in about the same zone as guayule is cultivated. It grows to a height of from three to five feet. It is estimated that a million tons of ashes, rich in potash, can be produced yearly from the green shrub. It takes about one year for the plant to develop from same roots after cutting. The leaves smell of iodoform. It is stated that in 1912 two German chemists obtained permission to make experiments on one of the haciendas situated in the States of Zacatecas and San Luis Potosi. Permission was granted on the understanding that they would furnish an exact report of their findings. The chemists made extensive experiments and disappeared without furnishing the report. Investigations indicate that after experimenting with several plants and shrubs they burned "Gobernadora," and apparently found satisfactory results in the ashes of this plant, as they departed immediately.

Hudson's Consolidated

Over a Million Tons of Manganese proved

MR. H. C. Howard-Tripp, who presided at the annual general meeting of Hudson's Consolidated, said that the company had taken over the valuable manganese property in Wales, for the acquisition of which new capital had been issued. These properties were being developed and worked, and some 5,000 tons of ore, which realised over £17,000, had been extracted in the course of their development operations. The estimate of their consulting engineer, Mr. Stockfield, that there was a million tons of ore available for working had already been exceeded, and they were now assured as a result of the past four months' work, of ore reserves showing a large increase on the original estimates. Manganese was an indispensable alloy in the iron and steel industry. The enormous market for their output was evidenced by the fact that the imports of manganese into the United Kingdom in the year 1918 amounted to 365,606 tons, the value of which was £3,397,435. India, hitherto, had been the great source of our supplies of manganese. A large proportion of the company's ore was in the form of rhodonite and silicate of manganese, which occurred in a form readily amenable to the recent developments in the manufacturing of silico-manganese and ferro-silicon—two alloys which were in great and increasing demand. About 2¾ tons of their manganese yielded about one ton of silicon. When the first unit of their new machinery now in erection had been completed, they would be able to handle from 300 to 500 tons of manganese per week. Mr. Stockfield believed the unit would be in full working order by the end of this year.

Industrial Chemists' Association

Work of the London Section

THE Council of the London Section of the National Association of Industrial Chemists promoted a dinner and musical evening at the Ship Restaurant, Charing Cross, on September 27. In spite of the difficulties created by the railway strike, there was a fairly good attendance of members and friends, presided over by Mr. H. S. F. Rhodes, Chairman of the London Section Council.

Mr. Rhodes emphasised the necessity of federation between the various organisations of scientists, and pointed out that the members of the Council had always been strongly in favour of federating, having twelve months ago passed a resolution recommending federation of the N.A.I.C. with other associations which had similar aims and objects. Although, he said, excessive pressure of other duties would shortly necessitate the resignation of his position as Chairman of the London Section, he could assure his audience that he would always be prepared to do whatever he could for the association. In conclusion, he thanked the members of the Council for the kindness they had always displayed towards him, and asked the members of the association to give the council all the assistance they could.

Mr. F. N. Harrap, Secretary of the section, gave a short resumé of the history of the section, and pointed out the advisability of adopting a policy of decentralisation, by the institution of branches, similar to that already started in Dartford. He quoted extracts from the speech of Mr. S. R. Todd, of the Ministry of Labour, at Burlington House; Mr. Todd said that scientific and technical workers were almost invariably left out in any dispute between capital and labour, and, whilst he was not out to advocate trade unionism, there could be no representation without organisation. If the scientific workers would make it clear to the industries concerned that there was a demand for representation, the Ministry of Labour would welcome such action, and would do its best to further the demand. Mr. Harrap explained that the question of registration as a trade union had been decided, and the association would probably be registered within a few days. The new year would probably see the appointment of a salaried secretary and the transference of the headquarters of the association to London.

With regard to the question of federation with other scientific bodies, the speaker pointed out that the Federation of Technical and Scientific Professional Associations had already been formed, with Mr. A. C. J. Charlier (President of the N.A.I.C.) as president. The federation, consisting of professional associations operating as trade unions, would meet on October 18, to fix the rules and constitution.

In conclusion, the Secretary appealed to the members to maintain their interest in the association, and to realise that progress for the first two or three years, whilst the association was being organised, must necessarily be somewhat slow.

Western Counties Basic Slag Co.

To the Editor of THE CHEMICAL AGE.

SIR,—In a recent issue of your Journal there appeared an abbreviated report of a prosecution against The Western Counties Basic Slag Co., of Manchester.

We think it due to point out to you that The Western Counties Basic Slag Co., of Manchester, is not now in existence, as that company was sold over on July 28 last and a limited company formed, and the registered offices are in Liverpool. There has been no action against the new company.—Yours, &c.,

THE WESTERN COUNTIES BASIC SLAG CO., LTD.

8a, Queen Insurance Building,
10, Dale Street, Liverpool, October 8.

THE RESIGNATION IS ANNOUNCED of Dr. J. O. Arnold, Professor of Metallurgy and Dean of the Faculty of Metallurgy in the University of Sheffield. Dr. Arnold has been connected with the University for thirty years, and has done much to bring the technical side of that institution to its present eminence. He had a breakdown in health about a year ago, and has been unable to attend to his duties for some months.

Streatfeild Memorial Lecture

Applied Chemistry in Relation to University Training

THE second annual memorial lecture organised by the Committee of the Streatfeild Memorial Fund was delivered by Professor G. T. Morgan, D.Sc., F.R.S. (Vice-President of the Institute of Chemistry) at the City and Guilds Technical College, Finsbury, on Thursday, October 2nd. The lecturer took as his subject, "Applied Chemistry in Relation to University Teaching."

THE CHAIRMAN, explaining the purpose of the foundation of the Streatfeild Memorial Fund, said that Mr. F. W. Streatfeild was a demonstrator and lecturer in the City and Guilds Technical College from the beginning of the Chemical Department, and had devoted himself in the most whole-hearted and self-sacrificing manner to the interests of the students. In the hearts of those students the memory of Mr. Streatfeild would always remain green, and as succeeding generations came who did not know him personally, and had not the usual means of learning what he had accomplished, some steps had to be taken to maintain that feeling which his students had developed. The result was the foundation of the memorial lecture, to be given annually by one of his old students. Associated with the delivery of the lecture was the award of the Streatfeild prize annually for efficiency in practical chemistry during the year. That subject had been chosen because it was more in practical chemistry—in the laboratory aspect of the subject—that Mr. Streatfeild's great talents and unflagging industry showed itself in the most marked degree. The Committee had on this occasion awarded the prize to Mr. F. D. Hocking.

The Value of Science to Industry

PROFESSOR MORGAN, in the course of his lecture, which was largely a detailed historical review of the development and work of the college and similar institutions, said it was common knowledge that Great Britain was the first nation to reach the industrial phase of human development, and that, owing to the absence of foreign competition, British industrialists and manufacturers were able at first to make considerable profits on rule of thumb methods of production. Foreign rivals, however, were forced by competition to employ less wasteful methods, and they speedily found that economy came from the application of science to industry. The harvest produced by the fertilisation of industry by science soon had an influence in the markets of the world. Public opinion in this country became perturbed, enquiries were set on foot in the competing countries, and a demand arose for technical education. To meet this demand the great livery companies of the City of London combined to found the City and Guilds of London Institute. Under the auspices of the Institute, the Technical College, Finsbury, was established in 1878.

At that time there were very few establishments in London where laboratory facilities existed for the study of practical chemistry. An older institution, the Royal College of Chemistry, had been transferred from Oxford Street to South Kensington, where it was merged in the Normal School of Science, afterwards the Royal College of Science. It was from this institution that Finsbury derived Messrs Castell-Evans and Streatfeild, who, with Professor Armstrong and Mr. Norris, from the London Institution, constituted the Chemical staff when classes were first held at Finsbury.

Streatfeild's Great Work

Streatfeild, who had originally intended to take up medicine, had gained considerable experience in chemical research with two organic chemists in a private laboratory in Lincolnshire, and later carried out industrial investigations in the distillation of coal and coal tar. From the outset the work of the Department of Applied Chemistry had an immediate bearing on the chemical industry, and in his highly practical teaching, Streatfeild proved himself to be a most inspiring leader. He preferred the organic branch of the subject, but nevertheless, his knowledge of inorganic chemistry was extensive and precise. His evening lecture demonstrations on applied organic chemistry were attended, with great appreciation, by men, who, for the most part, were engaged by day in related chemical trades, and the topics included oils and fats, brewing and fermentation, vinegar, oxalic acid, soap and candle manufacture, coal tar distillation and the synthetic dyes, all of which, beside many other chemical matters, were clearly explained by a complete series of admirably chosen experiments.

The "Super-Dreadnought" Theory

After referring to the organisation of the Finsbury College, the Central Technical College, the Sallus' Institute and other centres for the teaching of chemical science, Professor Morgan said that the Institute aimed at the promotion of higher education in industrial chemistry by awarding fellowships and scholarships, tenable at the existing universities and technical colleges in London and the provinces. This far-sighted policy had a bearing on the theme that technical instruction should not be concentrated in one colossal institution, but should be rendered available in many educational establishments of a less pretentious order. The underlying idea of the "super dreadnought" theory of technical education—which was very fashionable at present—was that maximum efficiency was to be obtained by concentrating all one's efforts in a central institution. This idea had recently led to a demand that the Imperial College of Science and Technology should be accorded the status of a university, with power to grant degrees in technology. Nothing had yet been said publicly as to the claims of Finsbury and of the polytechnic schools for incorporation with this technological university, but any scheme which excluded the oldest of the technical colleges branded itself not as constructive and imperial but as anarchic and revolutionary. It would be to the mutual advantage of the Royal College and the Finsbury College if the two could be brought into harmonious co-operation within the fold of the same university, but in such a manner that each college retained its own distinctive individuality.

Another view of the relationship of applied science to university training which must be taken into consideration, however, was that advanced instruction and training in technology ought not to be divorced from the wide educational basis which could be found only within a university. The advantage to students of applied science of being in close association with a general storehouse of learning and scholarship was too obvious to be denied.

"Pure" and "Applied"

Chemistry was a branch of scientific study to be found in the curricula of both universities and technical colleges, and it might be asked wherein lay the difference, so far as college training was concerned, between pure and applied chemistry. Fundamentally there was no difference; the underlying principles were the same in both cases. There was but one chemistry, founded on great generalisations. The cardinal principles embodied in the atomic and molecular theories, in the doctrines of valency, and in the periodic classification of the elements must be assimilated by the student before he could hope to become a master of his subject. It was only when these foundations had been well and truly laid that a superstructure of higher study and research might be added with safety and advantage. In a university this higher work might take the form of researches in pure science without immediate regard to their possible utilisation, whereas in the technical college it might consist of a study of industrial operations and their products.

One of the most valuable features of the Finsbury curriculum was the admittance of chemical students to classes in applied mechanics, machine drawing and electrical engineering, which were of fundamental importance to students who, in taking up industrial chemistry, would have to deal with engineering problems. In the technical colleges referred to, a characteristic feature of the training was the large proportion of time spent in the laboratory. Students of applied chemistry should have the subject at their fingers ends not less than in their brains.

Further encouragement should be given in technical colleges in the carrying out of processes under works conditions as regards filtration, distillation, extraction, mechanical stirring and heating under reduced or increased pressure, and at Finsbury the requisite plant had been constructed in the chemical workshop. These appliances, which had done good service for the Chemical Warfare Committee, would be equally useful in giving students an insight into the factory equivalents of the beaker, flask and filter pump.

Future Developments at Finsbury

With regard to future developments, it might be said that the establishment of Finsbury on a university basis would cost a great deal of money. This would certainly be the case if the task were taken in hand by the Government, and the result might be a chemical Chepstow and a scientific Slough. Providing, however, that the scheme were not unduly rushed, and that the new development was allowed to grow naturally from small beginnings, the greater part of the funds could be obtained from those who would benefit from the increased facilities. The adaptation of the new suite of rooms to chemical purposes had cost approximately £1,200, and there was a rush to take advantage of the new facilities. Several chemical firms had sent post graduate students to take up special lines of research. These firms paid higher fees than the ordinary chemical students, and also supplied a considerable part of the consumable material. In two years more than a third of the outlay was recovered, while there was little increase in overhead charges and cost of running. This development was so promising financially that if profit were the only consideration it would pay to drop the elementary work altogether and to convert the teaching laboratories of the old wing into another research section, which could be filled easily and profitably by post graduate investigators in industrial chemistry. But to make this drastic change would be to fall away from the lofty ideal aimed at by Streatfeild—a combination of elementary teaching and specialised research. The most laudable solution would be to dovetail together these two activities, for in this blend of instruction and research lay the best hope for the future of Finsbury.

THE CHAIRMAN, at the conclusion of the lecture, said that the great difficulty that confronted technical education as a branch of intel-

lectual effort was the difficulty of finding the right men to teach. We must have men who understood the conditions of a factory, but who were at the same time sufficiently academic in their outlook to be able to present the subject to students beginning their courses in a properly balanced form. Professor Morgan, after completing his course as a student, had spent five years in a colour factory, and had acquired a clear idea of factory requirements, upon which he had built a distinguished academic career.

The Streatfeild medal which was awarded annually to the lecturer, was presented to Professor Morgan by the Chairman, who also proposed a vote of thanks.

PROFESSOR ECCLES (Dean of the College), seconded the proposal which was passed unanimously.

Rhineland Chemical Works

Notes by Mr. John Allan on a Recent Visit

MR. JOHN ALLAN, Chairman of the Manchester Section of the Society of Chemical Industry, took for the subject of his address, at the opening of the Session, on Friday, October 3, "Notes on the Rhineland Chemical Works." He had a large audience.

Mr. Allan described at length the impressions of a visit to the heart of the German chemical industry located in the valley of the Rhine. The occupation of the Rhineland areas by the Allied Forces had made this visit possible. He discussed the advantages to the industry which had arisen from Governmental assistance and banking facilities. Not the least of the natural advantages of the German chemical industry, he said, was the possession of the Rhine valley and of its tributary streams. Along the 200 miles of the navigable length of the river in German territory were the greatest of the chemical works. The river provided at once a means of transport for raw and finished products, both internal and sea-borne, a supply of water for all kinds of technical operations, and a ready means of disposing of effluent, while in close proximity to the water front were to be found the great beds of brown coal, which supplied fuel at a cost almost nominal. Lime, salt and pyrites were also available within the transport area. These natural assets were greatly added to by a network of broad and narrow gauge railways, laid down wherever needed, and operated under conditions peculiarly favourable to manufacturers.

The Chemist in Industry

German industrial enterprise, Mr. Allan said, owed a very great part of its success to close association with the national banking interest. The remuneration of chemists in the research departments of the large works had not been lavish. Before the war the commencing salary was on the average 3,000 marks, rising to 5,000 marks at the end of four or five years. The practice of rewarding a chemist for successful research by paying him a percentage of the profits resulting from the work had for some time been looked upon as unsatisfactory, mainly on account of the difficulty of determining a fair proportion of the work done in bringing to fruition a discovery resulting from the ability of a single individual. It might be generally stated that the men who might be designated chemical engineers were the product of the works themselves. It was always the chemist who held the right of final decision as to the arrangement and construction of plant, the engineer being held responsible for the engineering work only, in such matters as strength of materials and efficiency of power application.

An outstanding fact constantly forced upon one's notice in the large works was the extraordinary way in which the purely chemical industry in its development had carried forward with it other industries concerned with the supply of the materials, whether for power, plant, or process, which it demanded. This all-round advance of attached industries was in the greatest measure due to the utilisation of applied science, and particularly chemistry, in all branches of their work. The preparation of metals having special resisting or other properties would be impossible without the chemist, and the beautiful earthenware and enamelled apparatus to be seen in general use had been produced largely with his assistance.

Standardisation of Apparatus

Mr. Allan intimated that in his view much had to be learned from German methods in regard to the standardising of apparatus. On the subject of labour, he pointed out that as compared with pre-war conditions, the labour cost for the same output had increased by no less than 160 per cent. Lack of attention and carelessness were common, and the general assertion was that the possible output is now only about 50 per cent. of what it was. In the large works, though the variety of their products was great, there was no reckless plunging into the manufacture of an article which was not connected in some way with the essential part of their business. He instanced the operations of the Bayer Co., at Leverkusen.

In concluding, Mr. Allan said that while in the main the great factories were undoubted models of equipment and control, there were many others as badly equipped as the most antiquated of our English factories, particularly some of those engaged solely in the manufacture of heavy chemicals. Many others of the smaller works were as efficiently operated as the large ones, and, on their scale, as well provided with plant and scientific control. A peculiarity of German chemical manufacture was the large number of very small firms engaged in the preparation of a very few substances. Their output was invariably specialised in character, the processes used as a rule, yielding no by-products. Competition with Germany in all branches of chemical manufacture was likely to be even more severe than it had been in the past. Mr. Allan did not advocate a slavish copying of German methods, but said that profit lay in knowledge and appreciation of them, modified to suit our own needs.

Science and Industry

The Need of Mutual Recognition and Co-operation

MR. F. C. A. H. LANTSBERRY, M.Sc., F.I.C. Chief Chemist to the Birmingham Small Arms Co., is the new President of the Birmingham Metallurgical Society, and at the opening of the Session, on Thursday, October 2, at the Chamber of Commerce, Birmingham, he spoke on the subject of Science and Industry.

The Society, Mr. Lantsberry said, had rapidly grown in recent years—its membership to-day was 567—and it was probably no exaggeration to claim that among provincial technical societies it had the largest membership and was the most active. James Watt, scientist and genius, the centenary of whose death in 1819 had recently been commemorated in Birmingham, probably anticipated Cavendish in the discovery of the composition of water. In a letter to a friend, he said: "What does it matter who discovered the composition of water so long as it is discovered." Engineers, industrial chemists and metallurgists might follow the noble example of Watt, and determine what could be done for the immediate and future benefit of industries rather than spend the time in pruning themselves on the part played by their particular science in the winning of the war. In the past grave charges had been made as to the lack of business capacity on the part of the scientific man. He had upheld the reputed lack of commercial ability on the grounds that the man who combined the true scientific spirit and business acumen was rather rare, and, generally speaking, the man who attempted to be both scientific and commercial became really efficient in neither.

An Age of Specialisation

The present was an age of specialisation, for not only had a man to choose some particular branch of industry, but he had also to specialise in some section of that industry. The solution of the problem lay in sympathetic co-operation, and this was impossible between two experts who were mutually ignorant of the other's subject.

The time had arrived when more attention should be given to the acquisition of scientific knowledge through technical societies. Before industry could take full advantage of the benefits to be derived from the application of scientific methods, scientific knowledge would have to be more widespread. The majority of large manufacturers had appreciated the value of scientific assistance to the extent of providing their works with well-equipped laboratories, but the work of those laboratories was hampered by lack of appreciation of science on the part of the men with whom they had to deal. For the same reason, other manufacturers who were in dire need of the assistance of a well-equipped laboratory, hesitated to call in the assistance of investigators trained to work along proper lines. The fact that many manufacturers were equipping good laboratories and acquiring competent staffs of chemists gave hope that we were

at last realising the fact that we had been squandering our birthrights.

Some years ago a movement was started in favour of the local technical societies setting up a joint library, and he would like to see such a movement revived. Such a scheme had been adopted by the chemical societies in London, and incalculable benefits had been conferred upon the members. The first essential in the training of a technical investigator was that he should have a good groundwork in fundamental principles. He had known chemists and engineers to make good metallurgists, but he was convinced that the best metallurgists had a strong chemical bias in their initial training, for chemistry was the subject above all for developing the gift of detailed observation of phenomena.

Argentine Iron and Steel Co.

Effect of Labour Trouble on Export Trade

Baron Emile B. d'Erlanger, presiding at the seventh ordinary general meeting of the Argentine Iron and Steel Co. (Pedro Vasena e Hijos), Ltd., at Winchester House, Old Broad Street, E.C., last week, referred to the company's contingency fund of £125,000. This fund (he said) has been entirely invested in the business itself, and specifically for the purpose of purchasing in the United States, and erecting in Buenos Aires, an open-hearth basic steel furnace and steel rolling mill plant. As you know, Argentina does not produce any iron ore, but in the course of manufacture and the finishing of our products which we import from Europe, we are left with a large amount of scrap, whilst all the railways in the Argentine, and a great many other works also accumulate a large quantity of iron and steel scrap. The object of this furnace and mill is to make the best use of this scrap, which we can obtain on the spot, and to make our own steel ingots and roll some portion of the various sections of girders and other steel materials which are required in the course of our business. To a certain extent it is a new experiment, but the matter has been most carefully thought out by our local experts and manager, and I have every hope that their anticipations in respect of the return of that mill may not be disappointed.

Coal versus Oil Fuel

Mr. John C. Gibson, who had just returned from a visit to the company's works at Buenos Aires, said that from what he saw in South America it seemed evident that coal was going out and oil coming in. Those countries (he said) are quick thinkers, and they act quickly. British coal has become a dear combustible for them. They note reduced output of coal and strikes, and they see steamers waiting for coal cargoes and not able to get them. Oil they produce themselves, as yet in relatively small quantities, but for the present they can import it, and they are importing it. Once you convert from coal to oil you do not go back. Unless the coal output in this country resumes—and quickly—its old volume, there is not much hope of the cost of living, so far as food and clothing are concerned, going down here to any great extent. The leaders of the miners, it is possible, may regard these South American oversea markets as too far removed from their purview to be considered of much importance, but one of those countries is a food producer. She cannot help it; nature intended her to produce food in abundance. If you do not ship and exchange your coal for her food, your food will cost you more. Under these circumstances, it seems useless to keep harping upon some of the miners' houses in this country not being good enough if it may be that there are no miners to live in them. Nationalising the coal mines will not help, because in these foreign markets of South America no one will buy where the source of supply is a Government when he can treat direct with the individual in an open competitive market. The coal market of the United States is open and competitive. I saw more American coal on the seaboard of South America than I saw British coal. A few years ago the former was seldom seen. From what I saw on that continent, apart from transport, on which I am not touching, it seems to me that there is no doubt that the chapter called "Coal," which has been open for so long, is coming to its last pages, and that a new chapter, called "Oil," has been opened. This concerns you in that your machinery is driven with oil and electricity, and you are making oil tanks for transport and for other industries.

Kinta Tin Mines

The New Property in Perthshire

The annual general meeting of the Kinta Tin Mines, Ltd., was held on Tuesday in London, Mr. W. A. Luning presiding.

The Chairman said, that having regard to the liability for excess profits at the rate of 80 per cent. they had not considered it necessary to create a reserve fund for the eighteen months ended December last, but they had invested £10,000 in the Tyndrum Lead and Zinc Mines, which investment would be the nucleus of a new reserve fund.

As is generally known (he said) during the war there was an enormous demand for all the base metals, and owners of English mines were urged by the Government to produce on the most extensive scale. In many instances mines which had been closed for a number of years were re-opened. The lead and zinc mines at Tyndrum in Perthshire are an instance of a property lying fallow for over forty years. They were closed down at the time when lead dropped to a price at which it did not pay the mines to work and the presence of zinc was an obstacle which practically precluded work on an extensive scale. In those days zinc was of little value, but to-day it is one of the most important of base metals, lead to-day being £28 and spelter £41 per ton. The owner of the property, the Marquess of Breadalbane, was approached, and after considerable negotiations extending over some months a satisfactory arrangement was entered into to reopen the adit levels. No time was lost in laying out the property for the machinery which is now working. It was not considered advisable to form a large company before the mine had been proved up to the hilt. The old adit levels have either been opened up or are in process of being cleaned out, and disclose bodies of ore only waiting to be drawn to the mouth of the level and conveyed to the mill. It will be many years before any deep mining will have to be undertaken, which means that we have a dry mine and no pumping of water or haulage difficulties, two items which eat up profits. The mine is exceptional in one sense: every ounce of rock treated by the mill can be sold at a fair price to the makers of roads and for the building of concrete cottages and reinforced concrete buildings. The Tyndrum Mine is in the fortunate position of having no tailings problem to solve.

Textile Firms' Lack of Dyewares

At a meeting of the Dewsbury Chamber of Commerce held last week, the President (Mr. Medley) said that Yorkshire textile manufacturers were still experiencing the very greatest difficulties owing to their inability to get dyewares, particularly bright colours which were fast to milling. With the exception of sulphur black, synthetic indigo, and chrome yellow and brown, such as could be obtained during the war, he was advised that local manufacturers were still dependent upon Swiss firms for 75 per cent. of their total colour requirements. It was not a question of obtaining cheap dyewares so much as an adequate supply of the absolutely necessary colours. Months ago a licensing committee was appointed by the Board of Trade, but there was on it no representative of the woollen trade. Up to now he had not heard of any licences being granted to import German dyestuffs into this country, yet everybody understood that that committee had to control the arrangements for the supply of dyestuffs by Germany and Switzerland. Why, if these dyes had to come from Germany, should the Yorkshire manufacturers of woollen goods not be placed on an equivalent plane with the Americans? The American Government had issued an order allowing the import from Germany of a six months' supply of dyewares. To a large extent the British woollen industry was being held up, though it was particularly essential to the heavy woollen trade that there should be an adequate supply of colours, bright in shade, fast to light, and capable of withstanding heavy milling. The anxiety of woollen manufacturers was lest they should be compelled to fall below the pre-war standard of efficiency, or suffer in comparison with any foreign production. Whilst hoping that British producers of dyestuffs would be able to meet the needs of the trade with colours equal to foreign production, something should be done in the meantime, and that quickly, to relieve a very difficult situation. It was resolved to bring the whole subject to the notice of the Board of Trade and the Associated Chambers of Commerce.

Labour-Saving in Works

Increasing Use of Mechanical Appliances

THE important question of the introduction of labour-saving appliances in works is the subject of a separate chapter in the Annual Report on Factories and Workshops for 1918.

Since 1914, it is stated, a great increase in the use of labour and fatigue-saving devices has been noted in all classes of factories. But for the difficulty experienced in obtaining the necessary plant and the labour to erect it, many more labour-saving devices would have been installed by employers during the past few years. Considerable developments in connection with plant for handling materials, &c., may, therefore, be anticipated in the near future. The extensive introduction of labour-saving devices has been due mainly to the following causes :—(1) The advent of women into many industries where their limited physical powers tended to place them at a disadvantage as compared with men ; (2) the necessity for economy of manual labour owing to its scarcity and increasing cost ; (3) the massed production of articles of the same size ; (4) the mass production of articles, such as shells, of a form which readily lends itself to simple mechanical methods of handling and transport.

The first step to be taken in connection with labour-saving should be made in the planning and arrangement of the factory itself, so as to minimise the amount of handling of both raw and finished materials. Such factories have railway sidings carried into them, suitable cranes or other lifting arrangements for loading and unloading trucks, the various shops and the machines in them are so arranged that the processes follow one another in a proper sequence, and the articles in course of manufacture are moved from place to place by means of lifting and transporting appliances involving the minimum expenditure of energy on the part of the workers.

One very noticeable development during the war has been in connection with improvements in hand-trucks, trolleys, carts, and similar appliances used for the transport of materials and articles within factories. The withdrawal of the young and vigorous male labour and the substitution of female labour, as well as the necessity for rapid production of all classes of goods, especially munitions, has forced manufacturers in most trades to discard the old unwieldly and inefficient forms of trucks for the more efficient modern appliances which can be so easily handled. A form of truck, which has been extensively used, has the goods receptacle separate from the wheel carriage upon which it can be easily raised by the motion of a lever. The receptacle is often made of a special shape to suit the particular class of goods or material to be handled. Mr. G. A. Taylor (Bradford) has noted the use of these trucks in dyeworks and other inspectors have commented on their employment in various industries. Another form of truck is fitted with an elevating arrangement, by means of which the goods receptacle and its contents can be easily raised on to a bench or cart, and generally both the trucks and their loads can be taken into an ordinary hoist cage.

Mr. Dunolly (Southampton) reports upon a useful appliance for handling sulphate in a gas works where it was stored at widely separated points. The appliance consists of a low, easy running trolley upon which is mounted a swinging derrick fitted with a wire rope worked by a winch. The end of the rope carries a spring balance, with a large dial, to indicate the weight suspended, and there is an attachment on this weighing machine to which the empty sacks can be secured. It consists of an iron hoop fitted with hooks at its periphery, upon which the mouth of the sack is attached and held open for filling. The object aimed at is to enable women to easily fill sacks to the correct weight with sulphate and to deposit them with minimum effort into hand trucks for wheeling away.

A recent improvement in the design of the carts used in Bradford dyeworks has eliminated much heavy labour entailed by the lifting of cloth pieces, owing to the carts being lower than the feed and finishing ends of the machines.

Various forms of conveyors or carriers, manual, gravity and power operated, have been largely installed in all classes of factories during the past four years. These appliances have eliminated a great deal of lifting and trucking of heavy boxes in such premises as biscuit, soap, aerated water and beer bottling factories, and different types have been extensively used in shell works. One of the commonest forms of conveyors or carriers, extensively used in factories, consists of a series of steel or wooden rollers about 3 inches diameter mounted on plain or ball bearings supported on parallel rails carried on suitable frames. Other forms of conveyors have been introduced in different industries, *e.g.*, band conveyors in glass works for transferring the glass articles, bottles, &c., from the makers to the lehrs, work formerly done by boys ; in sack works, for taking sacks from the sewing machines to the examining room ; in munition works for conveying shells and shell cases, &c. ; in explosive works for conveying T.N.T. and other materials. Push plate, tray and various kinds of chain conveyors are used in chemical, fertiliser, gas and other classes of works for transporting materials in bulk.

Amongst the miscellaneous devices and arrangements which have been adopted to minimise labour may be mentioned automatic weighing and bag-filling machines for cement, flour and similar materials, also automatic weighing machines introduced into the conveytracks or roller benches for weighing shells, &c.

The Licensing of Dyestuffs

To the Editor of THE CHEMICAL AGE.

SIR,—The attention of this Association has been drawn to several instances of the Dyestuffs Licensing Sub-Committee refusing to grant licences for the importation of malachite green crystals of American origin.

The reason given for the refusal is that the Committee "understand this product is now available from British sources of supply." It is, however, significant to note that the Committee has ignored requests for information as to names of British manufacturers who can in fact supply, and our correspondents have endeavoured without success to obtain supplies from such leading British firms as British Dyestuffs Corporation, Ltd., Clayton Aniline Co., Ltd., L. B. Holliday & Co., Ltd.

I would, therefore, like to issue through your columns a public invitation to any British manufacturer who can supply to communicate with this Association in order that I may put him in touch with our members who are wanting the goods. The lack of supplies means that expensive plant in this country has to stand idle. The dye in question is essential to the manufacturers of finished silk goods, woollen goods, &c., it is indispensable for "topping" and brightening cotton goods, and is of the first importance in the leather, jute, pigment and other trades.

The Government has asked the country to increase its export trade, and at the same time we find one of its Departments not only hindering the manufacturer, but apparently wilfully and knowingly impeding the production of goods of a standard that will favourably compete in foreign trade.

This Association invites communication from firms who are suffering through the present unsatisfactory arrangements and who object to disclosing the whole of their private business to an individual firm bearing the official title of "The Central Importing Agency."

I would also add that the policy of this Association throughout is to foster British production. We would not for one moment urge that licences should be granted for the importation even of Allied dyestuffs where satisfactory British supplies are available at anything approaching a reasonable figure.—Yours, &c.,

THE BRITISH CHEMICAL TRADE ASSOCIATION,
O. F. C. Bromfield, *Asst. Secretary*.

80, Fenchurch Street, E.C. 3.

THE BI-MONTHLY RETURNS of the Midland Iron and Steel Wages Board show that during July and August, the average net selling price of iron advanced from £22 0s. 10d. to £22 18s. 5½d. Simultaneously there was a marked fall in output amounting to nearly 10 per cent. The application of the eight-hour shift is at present detrimentally affecting production. Ironworkers' wages go up under the sliding scale by 10 per cent. forthwith.

A CONSULAR REPORT STATES that the manufacture of soap was started in Zanzibar about fourteen years ago. Previously all the blue and brown mottled soap used for washing clothes was imported from Marseilles and Hamburg. There are now two factories, turning out each about 60,000 lb. of soap a month, which is not only used locally, but exported to Madagascar and to the mainland. Apart from the above two factories, which express their own coconut oil for making soap, there are four other smaller oil mills in which coconut and sim sim oil is expressed. In former times the oil was expressed by primitive native presses worked by camels ; there are only two of these mills still in existence.

From Week to Week

30,000 ACRES have been devoted to the cultivation of beet in Canada during the present year. In 1901 there were only 900 acres.

DR. EDWARD HOPE, Manchester, Research Assistant in the Laboratory of Organic Chemistry, University Museum, has been elected Tutor in Chemistry at Magdalen College, Oxford.

SIX GERMANS, experts in dyes, tars, and chemical products, have arrived at the Hotel des Reservoirs, Versailles, to superintend and verify the delivery of these goods to France.

YALE UNIVERSITY is about to establish a department of chemical engineering. A new laboratory will be built for practical work during the course and for a post-graduate course.

A MADRID TELEGRAM states that the Rio Tinto Mining Co. has granted an 8-hour day to its employees, and work is now proceeding normally.

THE QUEEN'S UNIVERSITY OF BELFAST has elected Dr. A. W. Stewart, lecturer in physical chemistry at Glasgow, to its chair of chemistry.

IT IS ANNOUNCED that Dr. Theodore W. Richards, professor of chemistry at Harvard University, has been elected president of the American Academy of Arts and Sciences.

A SEAM OF TORBANITE, it is stated, has been struck in the Norfolk oil-shale fields of a thickness of about 20 in. This seam occurs in the middle of a stratum of oil shale 8 ft. thick. The chief feature of torbanite is its high oil content.

THE EMPLOYEES of the United Alkali Co., (Ltd.), St. Rollox Chemical Works, Clasgow, have contributed a sum of £71 14s. to charitable institutions, including £36 to Glasgow Royal Infirmary.

MR. J. C. CLANCY, chemist for the Mathieson Alkali Works, Niagara Falls, N.Y., claims to have invented a new process for extracting nitrogen from the air. A new plant is being completed for the manufacture of ammonia. Mr. Clancy states that he will be able to manufacture ten tons of ammonia daily.

THE UNIVERSITY OF CAMBRIDGE has appointed Mr. J. R. Marrack, M.B., St. John's, lecturer in pathological chemistry for five years; Dr. Fenton, Demonstrator of Chemistry, and Mr. F. W. Dootson, M.A., Trinity Hall, additional Demonstrator, both for five years.

IN VIEW OF THE RAILWAY STRIKE, the Emergency Committee of the Ceramic Society has decided to postpone the Autumn Meeting at Stoke-on-Trent until the end of April, 1920. This will cancel the Spring Meeting arranged for London, 1920. The Autumn Meeting in 1920, will be held in the United States.

IT IS OFFICIALLY ANNOUNCED by the Board of Trade that no further exports of "petrol" or of other petroleum products from the United Kingdom, will be permitted to any destination unless under license from the Export License Department, 1, Queen Anne's Gate Buildings, London, S.W.1.

DR. R. H. A. PLIMMER, reader in physiological chemistry, University College, London, has been appointed head of the biochemical department of Craibstone Animal Nutrition Research Institute, which is under the direction of Aberdeen University and the North of Scotland College of Agriculture.

THE WASHINGTON CHEMICAL CO., Gateshead, Messrs. Burrell & Co., Ltd., paint and varnish manufacturers, London, and the Molassine Meal Co., Ltd., London, are among the firms who have promised to co-operate in carrying out the national scheme for the employment of disabled men.

SIR HENRY HADOW, at the annual meeting of the Armstrong College, Newcastle, referred to the foundation of two new chairs, one of organic chemistry, and one of experimental physics, and stated that the Department of Chemistry, among several other Departments, needed considerably increased space and equipment.

ACCORDING TO *Stubb's Weekly Gazette*, the failures in the United Kingdom for week ended October 4, were 16, an increase of five. The numbers of bills of sale registered and re-registered, 97, an increase of 29. Mortgages and charges registered by limited companies amounted to £2,181,000, the amount authorised (where stated) being £263,625.

THE ANNIVERSARY of a Tyneside chemical firm took place on October 4. On that date in 1794, the Earl of Dundonald and John Losh took out a patent for the manufacture of sulphate of soda and caustic soda. The works were situated at Bell's Close, Scotswood-on-Tyne. Three years later the firm became the successful company known as the Walker Alkali Co.

SOME FORTY MEMBERS of the Bradford junior branch of the Society of Dyers and Colourists paid a visit last week to the works of Messrs. William Smith & Co., Ltd. The various processes in the manufacture and dyeing of shoddy were explained by Mr. F. S. Smith and other members of the firm. The party afterwards visited the adjoining colliery of Messrs. Joseph Haigh & Co., and were conducted through the workings to the face.

THE NINTH London Medical Exhibition, which was opened on Monday at the Central Hall, Westminster—the first since the outbreak of the war—supplies proof of the advance that has been made by British chemists in manufacturing medical necessaries which for years have been imported from Germany. All the large British producing and supplying firms have stalls showing up-to-date products. One firm lists over forty medical substances in place of pre-war imports.

A VERDICT OF ACCIDENTAL DEATH was returned at an inquest held at Birmingham last week, relative to the death following an accident, of Leonard Baden Gittas, (19), carbolic plant assistant employed by Josiah Hardman, Ltd., chemical manufacturers, Aston Church Road, who slipped from some planks into a vat of boiling water while on a night tour of inspection. The works manager said that a fixed platform railed round would now be erected in place of the planks.

SIR HENRY MIERS, speaking on "The Future of the Manchester Literary and Philosophical Society" on Tuesday, at a meeting of the Society said that he would welcome a development which would enable the Society to cover a wider field than that implied by the term "scientific society." The present tendency, he pointed out, was to segregate scientific people more and more into special groups, and to draw a harder line between specialists and other people. The recent incorporation of the Chemical Industry Club had been a striking move in the right direction.

THE FIRST MEETING of the session 1919-20 of the Bristol and South Wales section of the Society of Chemical Industry, was held at the University College, Cardiff. Mr. W. R. Bird, the vice-chairman, read a paper on "Fractional Distillation in the Laboratory and in Practice," which was followed by a discussion. Mr. Bird outlined the older method for the separation of crude naptha and paraffins, and went on to describe and comment on the latest forms of separators invented during the war, such as those used under the authority of the Ministry of Munitions for the production of raw material for explosives.

WHEN THE MEMBERS of the American Chemical Society who attended the Philadelphia meeting got their laundry at the Bellevue-Stratford Hotel, just before the close of the annual convention, they found the following notice on the printed list of prices:—"Owing to dyes now being used, we will not assume any responsibility in the laundering of guests' apparel." This reflection on the American dye industry was warmly resented by some of the delegates, and at the ensuing session a resolution was passed declaring that the dye section viewed with great disapproval the expression of any such misleading statement as to the quality of American dyes.

U.S. IMPORTS FROM GERMANY. A comparison of the returns of imports into the United States respectively from Germany and the United Kingdom, during the year ended June 30, 1914, furnished by the British Vice-Consul in Philadelphia, reveals the following imports from Germany, which find no corresponding entry among the imports from the United Kingdom:—

	Dols.
Bronze, manufactures of	588,173
Cement: Roman, Portland, &c.	139,922
Sulphate of Potash	1,827,763
Lenses: optical instruments	237,598
Starch	227,723

It would appear advisable, *The Board of Trade Journal* states, for British manufacturers and merchants in any of the lines indicated above to consider whether they are in a position to make an effort to enter this market, and, if so, it is suggested that they communicate with the Department of Overseas Trade, stating precisely the goods they have to offer, the terms on which they propose doing business, the prices prevailing at the time in England and possible periods of delivery. Wherever possible, samples should be supplied. If comprehensive enquiries of this kind were sent to His Majesty's Commercial Secretary in Washington, an exhaustive investigation might be made as to the possibilities of a trade being done.

References to Current Literature

Only articles of general as distinct from specialised interest are included and given in alphabetical order under each geographical subdivision. By publishing this digest within two or three days of publication or receipt we hope to save our readers time and trouble; in return we invite their suggestions and criticisms. The original journals may be consulted at the Patent Office or Chemical Society's libraries. A list of journals and standard abbreviations used will be published at suitable intervals.

British

CARBONISATION. Low-temperature carbonisation and the fuel of the future. H. *Gas World*, October 4, 258-259. A general consideration of the subject. (See also CHEMICAL AGE, p. 451.)

ORGANISATION. Efficiency in the Chemical industry. J. H. West. *Chem. Trade J.*, October 4, 359-360. The means of increasing efficiency are dealt with, special reference being made to the Chemical Engineering Group of the Society of Chemical Industry.

POISONS. Some inorganic poisons. A. Hamilton. *Chem. Trade J.*, October 4, 363-367. Report of lecture at Harvard Medical School, dealing with arsenic, antimony, mercury carbon, bisulphide, and phosphorus.

REFRACTORIES. Investigation into the properties of refractory materials in coke-oven construction. *Gas World (Coking Section)*, October 4, 21-24. An account by W. C. Hancock of a research carried out at the initiation of the Iron and Steel Institute.

TAR. Hird's continuous tar distilling plant. S. Stonier. *Gas World (Coking Section)*, October 4, 17-20. A paper read before the Coke Oven Managers' Association at Crewe on September 2nd.

Colonial

FUEL. Brown coal as boiler fuel. *Industrial Australasian Min. Stand.*, August 21, 347-349. An account of work done at the power house of the Melbourne City Council.

French

FILTERS. The Vallez filter. L. Naudet. *Bull. Assoc. Chim. Sucr.*, July-August, 40-48. A description of a filter press installation in Michigan at which eight presses are worked by one man and two boys.

American

CARBON. The activation of carbon. N. K Chaney. *Amer. Electrochem. Soc.*, September (advance copy), 10 pages. An account of the development of highly absorptive carbon.

ELECTRIC FURNACES. A square deal for the electric furnace. H. G. Weidenthal. *Amer. Electrochem. Soc.*, September (advance copy), 6 pages. A defence of the electric steel furnace against trade prejudices.

IRON. The penetration of iron by hydrogen. T. S. Fuller. *Amer. Electrochem. Soc.*, September (advance copy), 17 pages. A record of experiments on the penetration of iron by nascent hydrogen at temperatures between 20° and 100° C.

LEAD. Lead plating from fluoborate solutions. W. Blum, F. J. Liscomb, Z. Jencks, and W. E. Bailey. *Amer. Electrochem. Soc.*, September (advance copy), 22 pages. An account of experiments showing the practicability and applications of electroplating with lead.

METALS. Factors governing the structure of electro-deposited metals. W. Blum. *Amer. Electrochem. Soc.*, September (advance copy), 20 pages. Electroplating experiments have been carried out over a wide range of conditions as regards temperature, electrolyte, current, etc.

POWER. Government ownership of water powers and electrochemical industry. *Trans. Amer. Electrochem. Soc.*, 1919, 305-328. A report made by the Committee of Public Relations to the Board of Directors of the Society.

WOOD. The phenomena of drying wood. H. D. Tiemann. *J. Franklin Inst.*, July, 27-50. A summary of work carried out by the U.S. Forest Service, together with a mathematical consideration of the stress relationships.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 4, Queen Anne's Gate Buildings, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
British India (Calcutta)	Glass, aluminium, soaps, chemicals, &c.	733
Canada (Winnipeg)	Druggists' sundries	737
Canada (Toronto)	Glassware. Replies to the Canadian Government Trade Commissioner's Office, Portland House, 73, Basinghall Street, London, E.C. 2.	
Austria (occupied territory)	Soap, candles, copper, compounds, &c.	746
Italy (Leghorn) ..	Soaps, &c.	761
Italy (Milan) ..	Oils, fats. Replies to the Secretary, British Chamber of Commerce for Italy. Via Silvio Pellico 12. Milan	185
Italy (Naples) ..	Chemicals and dyes, metals, and leather..	829
Spain (Madrid) ..	Chemicals	838
France, Montauban (Tarn-et-Garonne)	Chemical manures and fertilizers ..	813
Paris	Chemicals, drugs and pharmaceutical products	814
Canada (Winnipeg)	Druggists' sundries, soaps	791
Canada (Toronto)	Soap-dies. Replies to Canadian Govt. Trade Commissioner's Office, Portland House, 73, Basinghall Street, E.C. 2.	—
British West Indies (Trinidad)	Portland cement	802
Belgium (Verviers)	Aniline dyes	808
Belgium (Liège) ..	Soap, paints and varnish	810
Germany ..	Oils, edible and technical	821
Italy (Genoa) .	Oils	828

Patent Literature

We publish each week a list of selected complete specifications accepted as and when they are actually printed and on sale. In addition, we give abstracts within a week of the specifications being obtainable. Readers can thus decide what specifications are of sufficient interest to warrant purchase, the only way of obtaining complete information. A list of International Convention specifications open to inspection before acceptance is added, and abstracts are given as soon as possible.

Abstracts of Complete Specifications

118,848. Suction Gas Scrubbers and Coolers. W. Hart, 150, Ramsay Road, Haberfield, near Sydney, Australia. International Convention date (Australia), August 28, 1917. (*See illustration.*)

Water from the tank 17 is delivered by a pump through the pipe 19 on to a series of inclined perforated plates 15, so arranged that the water passes partly through the perforations and partly over the edge of each plate on to the next. Gas from the generators enters the chamber 10 by the pipe 21, and passes in counter current over the wet plates to the passage 6. The gas then passes in a zigzag manner through the tubes 7, as shown by the arrows, and is finally delivered in a cooled and purified condition through the pipe 9. The tubes 7 are cooled by a current of air which is circulated by the fan 14.

119,038. Washing Coal and concentrating Ores and Minerals, Method and Apparatus for. T. M. Chance, 830, Drexel Building, Philadelphia, Pa., U.S.A. International Convention date (U.S.A.), August 27, 1917. (*See Illustration.*)

The tank 1 contains a mixture of water and comminuted solid material, *e.g.*, sand, which is kept agitated up to the level of the line 2. The agitation may be effected by introducing water under pressure through the pipe 8, chamber 5, and perforated bottom 4, or by introducing water through the pipe 12 to the spraying arms 9, which may or may not be positively rotated by external means. When the agitation is uniform, a layer of water up to the level 3 will float upon the layer of mixed solid and liquid below. The material to be separated is introduced from the receptacle 17 and passes through the water layer to the mixed layer below, where it is separated. The lighter constituent rises to the top, where it is removed by the elevator 18 and the heavier constituent sinks and is removed by the elevator 19. The materials are delivered on to the screens 20, 21 respectively, where water is removed and passes off by the pipes 24 to the pump 25 and conduit 26. The materials removed by the elevators 18, 19 are washed by their upward passage through the layer of water to free them from adherent sand. Any floating material which is separated is removed through the water overflow 27.

119,235. Kilns or Shaft Furnaces. C. Candlot, 37, Rue du Roche, Paris. International Convention date (France), March 23, 1917. (*See illustration.*)

Material which has been treated in the kiln 1 passes downward on to a set of four conical grinders having their axes horizontal and having their points supported in a journal at the centre. The conical surfaces are slightly separated from one another, and are provided with teeth 13. All the cones are rotated by gearing from a single transverse shaft, and the material in the kiln is thereby disintegrated, falls on to a horizontal plate 14, and thence to a collecting surface 15 and conveyor 16. Each of the cones is provided with a clutch, so that it may be disconnected in the event of binding of the material. The cones may be perforated so as to allow the passage of the air necessary for the operation of the kiln.

120,551. Platinised Asbestos, Manufacture of. G. Frabetti, 6, Via Gesù, Milan, Italy. International Convention date (Italy), November 5, 1917.

Platinised asbestos for use as a catalyst, *e.g.*, in the oxidation of sulphur dioxide for the manufacture of sulphuric acid, is made by dissolving platinum in aqua regia, evaporating off the nitric acid, adding hydrochloric acid, and neutralising with sodium carbonate. The solution is then poured on to asbestos which is saturated with distilled water. The mixture is raised to 60° C., formic acid added, and the mixture agitated. The platinum salt is thereby reduced and platinum deposited in the asbestos, which is then washed to eliminate chlorides, dried, and treated as required for use as a catalyst.

131,930. Alkali Percarbonates. H. Wade, London (*From Deutsche Gold & Silber-Scheideanstalt vorm. Roessler, Frankfurt a/M, Germany*). Application date, August 20, 1917.

Solid alkali percarbonates are rendered stable by mixing with them either before, during, or after their manufacture, one or more of the following substances, viz., magnesium silicate or chloride, alkali silicate, or gum-arabic. Part of the addition may be made before or during manufacture, and the remainder added to the finished salt.

131,938. Volatile Solvents used in Manufacture, Process for the Recovery of. J. H. Bregeat, 6, Rue St. Georges, Paris. International Convention date (France), November 20, 1917. Addition to 128,640, May 25, 1917.

The process described in Specification 128,640 (*see our issue of August 2*) for the recovery of volatile solvents by combination with phenols, is found to be applicable to the recovery of propyl and butyl alcohol, and methyl, propyl and butyl acetate.

131,942. Ammonia, Process for the Oxidation of. J. R. Partington, School Lane, Lostock Gralam, Cheshire, and E. K. Rideal, 28, Victoria Street, London, S.W. 1. Application date, April 10, 1918.

The object is to remove the water formed during the oxidation without removing appreciable quantities of oxides of nitrogen. A larger proportion of air or oxygen than is theoretically necessary to produce nitric oxide is used, and the gases are passed into a cooler and cooled to 30° C., the cooling operation occupying not more than 30 seconds. In this manner the water is removed by condensation before oxidation of the nitric oxide has time to take place, and therefore without loss of the higher oxides by solution in water. The cooling may take place in a chamber into which the gases and cold air are injected tangentially, or the gases may pass from the converter through an air-cooled pipe and then through a water-cooled coil in rapid succession.

131,956. Sodium Sulphate, Removal of—from Solution. F. A. Freeth, Heyesmere, Sandiway, Cheshire, and H. E. Cocksedge, 5, Romola Road, Herne Hill, London, S.E. Application date, May 31, 1918.

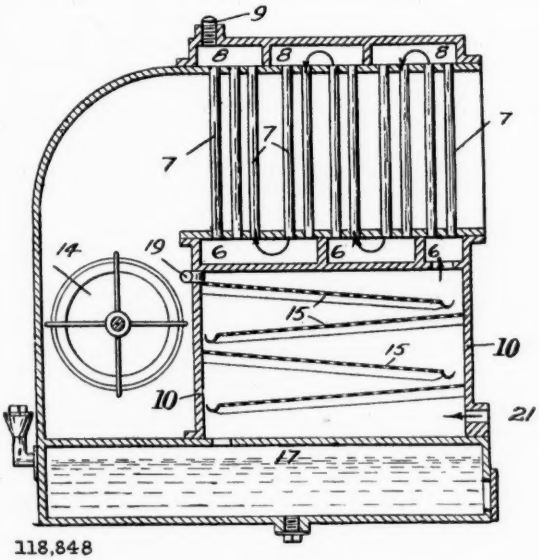
A saturated or nearly saturated solution of normal sodium sulphate, with or without other salts, is digested at a slightly higher temperature with anhydrous or hydrated calcium sulphate, or a soluble calcium salt such as the chloride or nitrate. A double salt of calcium and sodium is formed and precipitated, and is then removed and digested with sufficient water to convert it into a solution of sodium sulphate and a precipitate of calcium sulphate. The sulphates of sodium and calcium are then separated by any known means.

131,964. Cyanides, Production of. N. Testrup and Techno-Chemical Laboratories, Ltd., "Fairlawn," Clarence Road, Clapham Park, London, S.W. 4. Application date, July 3, 1918.

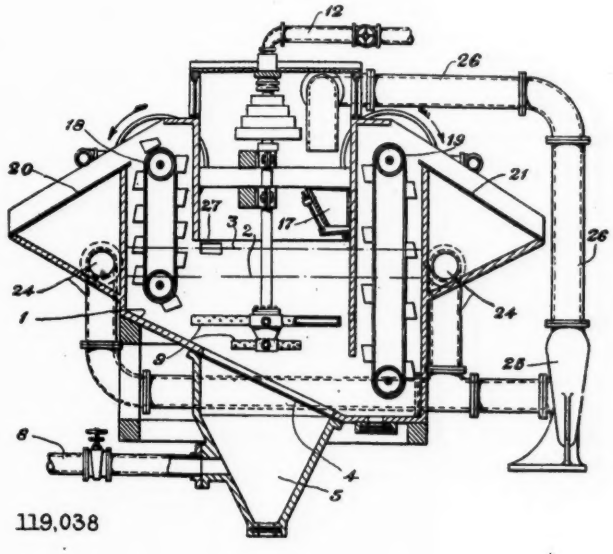
The apparatus is of the general type described in Specifications 115,087, 129,758, and 129,771, in which the material to be treated is carried through a flat horizontal reaction chamber by means of a conveyor forming the floor of the chamber. A finely-divided compound such as barium carbonate is sprayed together with carbon into the reaction chamber. Air for combustion passes through a chamber just below the conveyor, thereby cooling the latter, and then through zigzag passages in a regenerator, which are heated by intermediate passages through which the combustion products escape. The hot air enters the reaction chamber adjacent to the materials to be treated in such a proportion that carbon monoxide is the sole product of combustion. The barium cyanide produced is carried out of the reaction chamber by the conveyor.

132,069. Tunnel Furnaces. A. Bigot, 112ter, Avenue de Duffren, Paris. International Convention date (France), November 8, 1917.

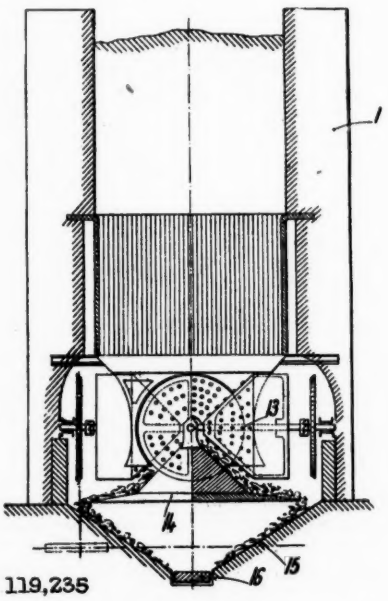
The carrier for the goods is constructed of refractory material and is supported on balls of refractory material running in longitudinal ball races. In order to secure a sufficient resistance to crushing at high temperatures, the parts are constructed preferably of corundum or fused bauxite or alternatively alumina, carborundum, compounds of chromium, magnesium, and rare earths. The height and internal volume of the furnace are reduced by this construction. The furnace is composed of an internal refractory jacket resting on a base of insulating material, and the whole is surrounded by an outer wall spaced from the jacket, the intermediate space being filled with a light refractory material in powdered form. When the furnace is used for very high temperatures the platform carrying the goods is supported on a thick block of insulating refractory material which rests on the support carried by the balls. Suitable projecting baffles are provided on the upper platform and the wall of the furnace so that the moving parts are protected from the high temperature in the upper part of the furnace.



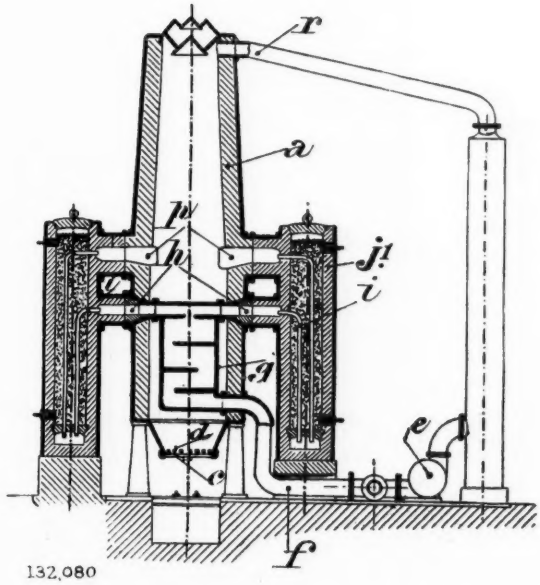
118,848



119,038



119,235



132,080

132,080. Electric Resistance Furnaces for Heating Gases. J. Simon, 16, Chemin de la Croix-Merlon, Lyons, France, and P. F. Sarron, 3-4, Rue de Vienne, Lyons, France. Application date, September 24, 1918. (*See illustration.*)

The illustration shows the application of the invention to the heating of the gases for a calcining furnace. The material is fed into the furnace *a* at the top, and the lower end is rendered gas-tight by a door *c* below the grating *d*. The heating gas is carbon dioxide, and it is delivered by the pump *e* into the pipe *f*, and thence to the recuperator *g*, provided with baffles. The gas is heated by the material in the furnace which surrounds the recuperator *g*, and then passes through the pipes *h* into a series of tubes *i* of cast quartz embedded in a pulverulent mixture of graphite and carborundum and enclosed in firebrick j^1. The tubes *i* are strongly heated by an electric current which passes through the surrounding material. The hot gas then enters the furnace through the pipes *p*, and passes upward through the material to the pipe *r* and thence to the pump. The calcined material is discharged intermittently. A modification of the apparatus for heating the gas for a blast furnace is also described in detail.

132,120. Catalytic Reactions, Apparatus for. G. Calvert, "Elmhurst," Arlington Road, Twickenham Park, Middlesex. Application dates, May 13 and July 29, 1918.

The apparatus is for the purpose of producing aldehydes from the reaction of alcohol vapour and air in contact with a catalyst such as copper. The alcohol is evaporated in a small boiler, and the vapour is passed through a coil surrounding the reaction tube. The vapour then passes into the reaction tube, where it is mixed with air admitted through regulable orifices, and the ignited mixture then passes over the catalyst situated within the surrounding pipe coil through which the alcohol vapour passes. A modification is described in which a pair of reaction tubes are combined with an absorption device for the aldehyde.

132,164. Carbonaceous Materials suitable for Use as Filtering Media or for the Preparation of Filtering Media. J. Wetter, London (from M. Weinrich, 203, West 107th Street, New York). Application date, January 31, 1919.

A solution, such as molasses, containing sucrose or glucose, or both, is mixed with lime, with or without insoluble substances, such as calcium phosphate, fuller's earth, kaolin, kieselguhr, &c. A chemical action takes place at a suitable temperature, and a hard mass is formed. This is comminuted, calcined, cooled, and the free lime converted into carbonate or phosphate.

132,183. Fuel of the Briquette Type. W. C. Cash, 91, Piccadilly, Manchester. Application date, March 4, 1919.

Palm kernel shell or similar shell 53 per cent., coal refuse 25 per cent., and pitch 22 per cent., are mixed and pressed into briquettes.

International Specifications Open to Inspection

130,596. Furnaces. G. Siegwart and K. H. Siegwart, Lucerne, Switzerland. International Convention date, July 29, 1918.

A melting or annealing furnace is provided with a gasifier comprising one or more flat or recessed fireclay plates, which are heated by the radiation from the furnace. Hydrocarbons and water or water vapour are supplied to the gasifier, together with hot air for combustion. The water is dissociated by the heat, due to the combustion of the hydrocarbons.

130,608. Electrolysis; Artificial Resins. Resan Kunstharz-Erzeugungsges, Vienna. International Convention date, March 22, 1918.

A mixture of phenol, cresol, xylenol, or their derivatives, with aldehydes or substances which produce them, is electrolysed, and a hard resin is produced at the anode. The mixture may be placed in the anode compartment, which is separated by a diaphragm from the cathode compartment, in which an electrolyte, such as sodium chlorite, may be placed.

130,619. Nitrocellulose. J. Duclaux, 34, Rue du Bac, Paris. International Convention date, August 25, 1913.

Waste celluloid, &c., is dissolved in acetone, methyl alcohol, alcohol-ether, methyl formate or acetate, or ethyl formate. The solution may be purified by dialysing through membranes of viscose, or of cellulose precipitated from a cuprammoniacal solution, or of denitrated cellulose. Alternatively the nitrocellulose may be precipitated by adding water containing sulphuric acid or sodium carbonate, or by adding organic liquids, such as benzene, toluene, xylene, carbon tetrachloride, &c. The precipitate may be washed and boiled with water.

Latest Notifications.

133,026. Electric Furnaces. E. F. Collins. September 21, 1918.
133,027. Paraffin into Acids, Process for converting. Pardubitzer Fabrik der Akt.-Ges. fur Mineralol-Industrie, vorm. D. Fanto & Co. September 25, 1918.
133,041. Ammonia, Process for the direct oxidation of. L. Duparc and C. Urfer. September 24, 1918.
133,045–6. Recuperators. H. Hecker, and Bender & Frambs Ges. May 2 and September 10, 1918.

Specifications Accepted, with Date of Application

104,693. Superphosphates, Apparatus for the Preparation of. Chemische Fabrik Milch Akt.-Ges., and O. Rabenau. February 17, 1916.
107,584. Acetaldehyde, Manufacture of. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. June 16, 1916.
107,585. Acetaldehyde, Manufacture of. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. June 17, 1916.
120,201. Coke Ovens. O. Piette. September 10, 1918.
120,717. Suction-gas Plant. W. Hart. March 8, 1918.
125 932. Gas-producers. Chapman Engineering Co. April 20, 1918.
132,233. Cellulose Acetate, Manufacture of Compositions, Preparations, or Articles having a basis of. H. Dreyfus. April 29, 1918.
132,291. Separators, Centrifugal. R. S. Brownlow. June 11, 1918
132,298. Continuous Sulphonation of Aromatic Hydrocarbons other than Benzene. E. Barbet et Fils et Cie. June 16, 1917.
132,337. Distilling Hydrocarbons or converting them into products of lower boiling-points. L. Clark. September 9, 1918.
132,350. Kilns or Furnaces. W. L. H. Roberts. September 11, 1918.
132,381. Crucible Furnace. W. H. Williams. October 15, 1918.
132,387. Sulphur Dioxide, Manufacture of. J. Grayson. October 31, 1918.
132,308. Gas-heated Crucible and like Furnaces. South Metropolitan Gas Co. and D. Chandler. November 19, 1918.
132,411. Aluminium Alloys. O. S. Wigan and W. Grover. December 6, 1918.
132,433. Benzoic Acid, Manufacture of. F. P. Leach and United Alkali Co. February 6, 1919.
132,445. Cooling Water and other Liquids, Towers and the like for. W. Holehouse. March 7, 1919.

Chemical Workers' Holidays

The following regulations for the Workpeople's Annual Holiday, 1920, signed by R. Lloyd Roberts, Chemical Employees' Federation, on behalf of the Joint Industrial Council, have been issued :—

1. A week's holiday with full pay will be given during 1920 to all workpeople who fulfil the following qualifications :—(*a*) Continuous service with the firm from April 1, 1919, to March 31, 1920 (*b*) Time lost without reasonable excuse during the qualifying period to be not more than seven shifts, or seven days; quarters and half days to be taken into account. (*c*) Satisfactory work and conduct during the qualifying period.

2. The wages to a time worker for the holiday week will be the amount he or she would have earned, exclusive of overtime, had he or she been working during that week.

3. In case of a piece-worker, the amount paid will be the average of the earnings of the six weeks immediately preceding the holiday week. If, in any case, owing to abnormal circumstances, this would operate unfairly, special arrangements will be made.

4. The holiday will be given at a time suitable to the convenience of an employer, but every effort will be made to give the holiday during the summer months.

5. The week's holiday pay will not be given at the commencement of the holiday, but will be retained until the next succeeding pay day. In exceptional circumstances this will be relaxed.

6. In the event of a worker, who has qualified for the holiday, being discharged owing to reduction of hands or reorganisation of work, he or she will be given either the week's holiday or a week's wages in lieu thereof. Workpeople leaving voluntarily will not be entitled to this concession.

7. Men returning from H.M. Forces to resume their previous employment with the firm will be given a week's holiday in 1920, provided they conform to the necessary conditions as to time-keeping and conduct during the period between their return and the date on which the holiday is given.

Eastern Chemical Co.

Presiding at the sixth ordinary general meeting of the Eastern Chemical Co., Ltd., held on Friday, September 26, at 13, Fenchurch Avenue, London, Mr. H. N. Morris said that since the last annual meeting the Commission appointed by the Indian Government, under the presidency of Sir Thomas H. Holland, to examine and report on the possibility of industrial developments in India, had issued its report. That gave much valuable information on the possibilities of the chemical industry, and recommended the assistance of the Government in the development of key industries such as theirs. Until some action was taken and carried out on the recommendations of the Commission the scheme of development to which reference was made at the last annual meeting was likely to be held up. The directors had already gone as far as they could in increasing the activities of the company. Some of the proposed extensions could be carried out on the present works site. They thought, however, that it would be best to form subsidiary companies, registered in India, to carry out certain of their proposals.

Monthly Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

THURSDAY, October 9, 1919.

ALTHOUGH the strike is now happily at an end, business is somewhat uncertain with prices nominally showing little change.

Up to the time of writing it is still practically impossible to move goods other than by road, and this is, of course, bound to have a hampering effect upon manufacturers' activities.

Export trade has been exceptionally good, especially in the heavy section, and a number of products are now becoming in increasingly short supply.

General Chemicals

ACID ACETIC is very active, and available supplies are readily absorbed at current rates. A fair business has been done in glacial.

ACID CARBOLIC.—A steady business is still being transacted in this material at last quoted prices.

ACID OXALIC.—Price is unchanged for prompt, but lower prices are obtainable for forward.

ACID TARTARIC is in active demand both for home trade and export, and the price is very firm.

ALUMINIUM SULPHATE.—A very good business is reported, and export is better.

AMMONIUM SALTS.—A very steady business is reported in all ammonium products, and makers are well sold. Sal ammoniac has been advanced £10 per ton for delivery during the first three months of next year.

BARIUM CHLORIDE is slow of sale.

BLEACHING POWDER remains quiet, although there would appear to be slightly better inquiry.

BORAX.—Makers are still in a heavily sold condition, but the home trade price is without change.

CALCIUM ACETATE.—Both the brown and grey are steady at last quoted figures.

COPPER SULPHATE is without feature, and the price, if anything, is a shade lower.

FORMALDEHYDE is in steady demand, and all available supplies are quickly absorbed.

IRON SULPHATE (Green Copperas) is more active, and the price is without change.

LEAD ACETATE.—The price is without change, but only in light demand.

LEAD CARBONATE (White Lead).—Producers are very heavily sold, and there have been a few arrivals of American-made material in this country.

LITHOPONE.—Available spot supplies are light, but some large shipments are expected to be to hand shortly.

POTASSIUM CHLORATE has been in better demand.

POTASSIUM PRUSSIATE is somewhat slow of sale, and lower prices have in some cases been accepted.

SODIUM ACETATE is easy, with very little business passing.

SODIUM BICARBONATE is active, with a good demand for export.

SODIUM CHLORATE is slow of sale, without change in value.

SODIUM CAUSTIC is in active request, especially for export, and higher prices have been realised.

SODIUM PRUSSIATE is scarce on the spot, and price very firm.

SODIUM SULPHIDE is firmer, and owing mainly to the recent strikes is in somewhat short supply.

ZINC SALTS are without feature, and price nominally without change.

Coal Tar Intermediate Products

Considering all factors, the demand for the intermediary products cannot be described as other than satisfactory, and values are well maintained.

ANILINE OIL.—There has recently been a strong demand for export, and important business has been done at steady prices.

ANILINE SALT.—The recent increase in price is still maintained, as sufficient supplies of hydrochloric acid are still difficult to obtain.

BETANAPHTHOL.—Makers continue to be well occupied with current business, and there are inquiries in the market for delivery over 1920, but makers seem reluctant to quote so far ahead.

DIPHENYLAMINE.—There has been an increased demand for this intermediate.

PARANITRANILINE is in better request, without change in value.

SODIUM NAPHTHIONATE has been in better request, and price is very firm.

SALICYLIC ACID is without change in this market.

Heavy Coal Tar Products

Business has not yet got back to normal conditions after the railway strike, and prompt delivery is practically impossible to obtain.

Prices remain firm, and manufacturers are still showing disinclination to quote prices for forward business.

BENZOL.—Home trade prices remain firm, and export business has been done at about 2s., f.o.b.

CRESYLIC ACID.—A fair amount of business has been reported, and the price remains steady at 2s. 4d. to 2s. 5d. per gallon for the pale 97 per cent., and 2s. 3d. to 2s. 4d. at works for the dark 95 per cent.

CREOSOTE.—There is a fair demand, and prices are indicated at 5d. and 5½d. to 6d. per gallon in the North, and 6d. to 6½d. per gallon in the South.

NAPHTHALENE.—£6 10s. per ton for the crude, and about £17-18 for refined.

SOLVENT NAPHTHA, 90-160, is in very fair demand, and business has been done at 2s. 4d. in the North and 2s. 6d. in London.

HEAVY NAPHTHA, 160-190, also remains firm, at about 2s. 2d. per gallon f.o.r. makers' works.

PITCH.—Business has been reported at 80s. to 85s. f.o.b. London, 75s. f.o.b. East Coast, and 67s. 6d. to 70s. f.o.b. West Coast.

Sulphate of Ammonia

There is no change.

French Market Report

The chemical trade in France has been much more active since the date of our last report, and there is evidence to show that the demand is slowly broadening. An increased volume of business is coming forward to this country, and although the exchange question still makes the conclusion of business somewhat difficult, yet means are being found to overcome this on an equitable basis, with resulting benefit to the trade in general.

It is rather unsatisfactory to note that, owing in the main to this exchange question, quantities of German chemicals are finding their way into the French market, with a corresponding loss in some cases to this country.

We are hoping, however, that this will prove to be only temporary in certain directions, but it is quite evident that English sellers who wish to maintain their position in the French market must take every step to keep themselves well informed of the actual position, as conditions are continually changing.

Some of the Belgian factories are now operating, and exporting in one or two cases.

ACIDS.—A fair business has been done in oxalic and phosphoric acids.

ALUM is in better supply, and price remains steady.

ALUMINIUM SULPHATE.—There is not much demand for this material, most consumers being fully contracted for the remainder of this year.

AMMONIUM SALTS are active, and improving business is reported.

BARIUM SALTS are without feature and price in buyers' favour.

BORAX is still scarce, and high prices continue to be paid for prompt delivery.

CALCIUM CHLORIDE is quiet.

LEAD ACETATE is quite active, and trade has been done at equal to £86 per ton c.i.f. French port.

MAGNESIUM SULPHATE COMMERCIAL is in better demand, and we think the position will still further improve.

LITHOPHONE remains in steady request.

NAPHTHALINE SALTS are still very quiet, although stocks are beginning to decrease, and one or two inquiries are commencing to come for flakes. A few orders have been placed for marbles at equal to about £48 per ton.

POTASSIUM SALTS remain scarce, and high prices are paid for spot deliveries.

SODIUM SALTS in general show improvement. Bicarbonate is in request, and there is more opening for caustic. Some good orders have been placed in England for bisulphite at £33 per ton c.i.f. for near delivery. Prussiate has been advanced and is now somewhat scarce.

ZINC SULPHATE.—After a considerable period of stagnation a few orders have recently been placed at equal to about £25 per ton c.i.f.

Coal Tar Intermediates

All the French dye manufacturers are now busily engaged, and some very good orders are being placed for English-made intermediates, which we are pleased to say, in many cases are preferred to those of American manufacture.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	9	to	0	3	0
Acetone oil	ton	77	0	0	to	80	0	0
Acetone, pure	ton	95	0	0	to	97	0	0
Acid, Acetic, glacial, 99-100%	ton	77	10	0	to	80	0	0
Acetic, 80% pure	ton	65	0	0	to	67	10	0
Arsenic	ton	65	0	0	to	70	0	0
Boric, cryst.	ton	72	10	0	to	73	10	0
Carbolic, cryst. 39-40°	lb.	0	0	9	to	0	0	9½
Citric	lb.	0	4	4	to	0	4	5
Formic, 90%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.	0	6	3	to	0	6	6
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	66	0	0	to	68	0	0
Lactic, 60 vol.	ton	82	10	0	to	85	0	0
Nitric, 80 Tw.	ton	33	0	0	to	35	0	0
Oxalic	lb.	0	1	2	to	0	1	2½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	0	to	0	2	2
Salicylic, B.P.	lb.	0	2	6	to	0	2	9
Sulphuric, 92-93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	3	0	to	0	3	3
Tartaric	lb.	0	3	3	to	0	3	4
Alum, lump	ton	17	10	0	to	17	15	0
Alum, chrome	ton	97	0	0	to	99	0	0
Alumino ferric	ton	8	10	0	to	9	0	0
Aluminium, sulphate, 14-15%	ton	14	10	0	to	15	0	0
Aluminium, sulphate, 17-18%	ton	18	0	0	to	18	10	0
Ammonia, anhydrous	lb.	0	1	9	to	0	2	0
Ammonia, .880	ton	32	10	0	to	37	10	0
Ammonia, .920	ton	20	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	6½	to	—		
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	44	0	0	to	45	0	0
Ammonia, nitrate	ton	55	0	0	to	57	10	0
Ammonia, phosphate	ton	115	0	0	to	120	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl, acetate	ton	215	0	0	to	220	10	0
Arsenic, white, powdered	ton	60	0	0	to	62	10	0
Barium, carbonate	ton	12	0	0	to	12	10	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	10	0
Chlorate	lb.	0	1	3	to	0	1	4
Chloride	ton	23	0	0	to	24	0	0
Nitrate	ton	50	0	0	to	51	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0

	per	£	s.	d.		£	s.	d.
Bleaching powder, 35-37%	ton	13	10	0	to	14	0	0
Borax crystals	ton	51	0	0	to	53	0	0
Calcium acetate, grey	ton	21	0	0	to	22	0	0
Carbide	ton	28	0	0	to	30	0	0
Chloride	ton	8	10	0	to	9	0	0
Carbon bisulphide	ton	58	0	0	to	59	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	0	to	0	1	2
Cobalt acetate	lb.	0	7	0	to	0	7	6
Oxide	lb.	0	7	9	to	0	8	0
Copper chloride			—				—	
Sulphate	ton	40	0	0	to	42	0	0
Cream of tartar, 98-100%	ton	240	0	0	to	245	0	0
Epsom salts (see Magnesium sulphate)								
Formaldehyde	ton	135	0	0	to	140	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	3	0	0	to	3	5	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	32	0	0	to	34	0	0
Iron sulphate (Copperas)	ton	4	10	0	to	4	15	0
Lead acetate, white	ton	82	10	0	to	85	0	0
Lead nitrate	ton	57	0	0	to	58	0	0
Litharge	ton	44	0	0	to	45	0	0
Lithophone, 30%	ton	44	0	0	to	46	0	0
Magnesium chloride	ton	15	0	0	to	16	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	11	0	0	to	11	10	0
Sulphate (Druggists')	ton	17	10	0	to	18	0	0
Methyl acetone	ton	89	0	0	to	90	0	0
Alcohol, 1% acetone	gall.	0	11	6	to	0	12	0
Nickel ammonium sulphate, single salt	ton	47	10	0	to	52	10	0
Potassium bichromate	lb.	0	1	6	to	0	1	7
Carbonate, 90%	ton	98	0	0	to	100	0	0
Chloride	ton	Nominal.						
Potassium Chlorate	lb.	0	1	2	to	0	1	3
Meta-bisulphite, 50-52%	ton	224	0	0	to	240	0	0
Nitrate, refined	ton	58	0	0	to	60	0	0
Permanganate	lb.	0	3	6	to	0	3	9
Prussiate, red	lb.	0	6	0	to	0	6	3
Prussiate, yellow	lb.	0	1	9	to	0	1	10
Salammoniac, firsts	cwt.	4	0	0	to	—		
Seconds	cwt.	3	15	0	to	—		
Sodium acetate	ton	48	0	0	to	50	0	0
Arsenate, 45%	ton	50	0	0	to	52	0	0
Bicarbonate	ton	9	0	0	to	9	10	0
Bichromate	lb.	0	0	9½	to	0	0	10
Bisulphite, 60-62%	ton	32	0	0	to	33	0	0
Chlorate	lb.	0	0	6	to	0	0	6½
Caustic, 70%	ton	22	0	0	to	22	10	0
Caustic, 76%	ton	23	10	0	to	24	0	0
Hydrosulphite, powder, 85%	lb.	0	3	3	to	0	3	6
Hyposulphite, commercial	ton	18	10	0	to	19	10	0
Nitrite, 96-98%	ton	58	0	0	to	60	0	0
Phosphate, crystal	ton	28	0	0	to	30	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	0	10	to	0	0	10½
Sulphide, crystals	ton	16	0	0	to	16	10	0
Sulphide, solid, 60-62%	ton	23	0	0	to	24	0	0
Sulphite, cryst.	ton	11	0	0	to	11	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	85	0	0	to	90	0	0
Sulphate	ton	8	0	0	to	10	0	0
Sulphur chloride	ton	38	0	0	to	40	0	0
Flowers	ton	24	0	0	to	26	0	0
Roll	ton	23	0	0	to	25	0	0
Tartar emetic	lb.	0	3	4	to	0	3	6
Tin perchloride, solution	lb.	0	1	6	to	0	1	9
Perchloride, solid	lb.	0	2	6	to	0	2	9
Protochloride, crystals	lb.	0	1	10	to	0	2	0
Zinc chloride 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	50	0	0	to	52	10	0
Oxide, 99%	ton	77	10	0	to	80	0	0
Oxide, 94-95%	ton	60	0	0	to	62	10	0
Dust, 90%	ton	70	0	0	to	72	10	0
Sulphate, 99%	ton	21	10	0	to	23	0	0

Coal Tar Intermediates, &c.

	per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	3	0	to	0	3	6
Alphanaphthol, refined	lb.	0	3	6	to	0	3	9
Alphanaphthylamine	lb.	0	2	6	to	0	2	9
Aniline oil, drums free	lb.	0	1	2	to	0	1	3
Aniline salts	lb.	0	1	5	to	0	1	6
Anthracene, 85-90%	lb.	0	1	5	to	0	1	6
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0

	per	£	s.	d.		£	s.	d.
Benzidine, base	lb.	0	5	6	to	0	6	0
Benzidine, sulphate	lb.	0	5	0	to	0	5	6
Benzoic, acid	lb.	0	5	0	to	0	5	3
Benzoate of soda	lb.	0	5	0	to	0	5	3
Benzyl chloride, technical	lb.	0	1	9	to	0	2	0
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	2	4	to	0	2	6
Betanaphthylamine, technical	lb.	0	6	6	to	0	7	0
Dichlorbenzol	lb.	0	0	5	to	0	0	6
Diethylaniline	lb.	0	7	0	to	0	8	0
Dinitrobenzol	lb.	0	1	4	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	2	to	0	1	3
Dinitronaphthaline	lb.	0	1	6	to	0	1	9
Dinitrotoluol	lb.	0	1	10	to	0	2	0
Dinitrophenol	lb.	0	1	3	to	0	1	6
Dimethylaniline	lb.	0	2	9	to	0	3	0
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	11	6	to	0	12	0
Metaphenylenediamine	lb.	0	4	6	to	0	4	9
Monochlorbenzol	lb.	0	0	9	to	0	0	10
Metanilic acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	0	to	0	8	0
Naphthionic acid, crude	lb.	0	3	3	to	0	3	6
Naphthylamin-di-sulphonic acid	lb.	0	4	6	to	0	5	0
Nitronaphthaline	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	3	to	0	1	6
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	3
Orthotoluidine	lb.	0	2	2	to	0	2	3
Orthonitrotoluol	lb.	0	1	6	to	0	1	9
Para-amidophenol, base	lb.	0	14	0	to	0	15	0
Para-amidophenol, hydrochlor.	lb.	0	15	6	to	0	16	0
Paradichlorbenzol	lb.	0	0	4	to	0	0	5
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	1	10	to	0	2	0
Paranitrotoluol	lb.	0	5	3	to	0	5	6
Paraphenylenediamine, distilled	lb.	0	14	0	to	0	15	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	8	0	to	0	9	0
Resorcin, technical	lb.	0	11	0	to	0	12	0
Resorcin, pure	lb.	0	17	6	to	1	0	0
Salicylic acid	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	9	to	0	5	0
Sulphanilic acid, crude	lb.	0	1	3	to	0	1	4
Tolidine, base	lb.	0	9	0	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Miscellaneous and Paint Materials

Barytes	ton	11	0	0	to	13	0	0
Casein	ton	75	0	0	to	80	0	0
Chalk, precipated (light)	ton	20	0	0	to	24	0	0
Chalk, precipated (heavy)	ton	10	0	0	to	12	0	0
China clay (bags extra) (f.o.r. Cornwall)	ton	1	12	6	to	3	12	6
Coke (blast furnace) (S. Wales)	ton	2	12	0	to	2	14	0
Coke (foundry) (S. Wales)	ton	3	5	0	to	3	7	0
Fuller's Earth	ton	4	0	0	to	5	0	0
Lead, litharge flake	ton	43	10	0	to	45	10	0
Lead, red	cwt.	2	2	6	to	2	7	6
Lead, white	cwt.	2	11	0	to	2	15	0
Ultramarine	ton	85	0	0	to	105	0	0
Prussian Blue	cwt.	11	0	0	to	11	10	0
Chrome green	cwt.	6	5	0	to	6	10	0
Chrome yellow	cwt.	6	5	0	to	7	0	0
Mineral black	ton	10	0	0	to	12	0	0
Carbon black	lb.	0	1	3	to	0	1	6
Guignet's Green, 30%	lb.	0	1	5	to	0	1	6

The following prices are furnished by Messrs. Miles Mole & Co., Ltd., 101, Leadenhall Street, London, E.C.

Metals and Ferro-Alloys

Aluminium, 98-99%	ton	152	0	0	to	155	0	0
Antimony (English)	ton	46	0	0	to	48	0	0
Copper, best selected	ton	115	0	0	to	116	0	0
Ferro-chrome, 60%	ton	50	0	0	to	55	0	0
Ferro-manganese, 76-80%	ton	26	0	0	to	27	0	0
Ferro-silicon, 45-50%	ton	25	0	0	to	26	0	0
Ferro-tungsten, 75-80%	lb.	0	3	0	to	0	3	2
Lead (ingot)	ton	26	0	0	to	26	15	0
Lead (sheet)	ton	36	0	0	to	36	0	0
Nickel, 98-99%	ton	208	0	0	to	210	0	0
Tin	ton	280	0	0	to	285	0	0
Zinc (spelter)	ton	44	0	0	to	44	10	0

Structural Steel

	per	£	s.	d.		£	s.	d.
Angles, tees and flats	ton	20	0	0	to	21	0	0
Joists	ton	18	0	0	to	19	0	0
Plates	ton	21	0	0	to	21	5	0
Rails, heavy	ton	18	0	0	to	19	0	0
Sheets, 24 G.	ton	25	0	0	to	25	10	0
Sheets, galvanised corrugated	ton	34	0	0	to	35	0	0

Building Materials

Bricks, stock	1000	3	16	0	to	3	17	0
Bricks, blue Staffs.	1000	9	2	0	to	9	4	0
Firebricks, Stourbridge	1000	10	8	0	to	10	12	0
Fireclay, Stourbridge	ton	2	2	0	to	2	4	0
Glass, sheet, 21oz.	ft.	0	0	8½	to	0	0	8¾
Lime, ground blue Lias	ton	2	10	0	to	2	10	0
Lime, grey stone	ton	2	15	0	to	2	16	0
Linseed oil, boiled	gall.	0	8	8	to	0	8	10
Linseed oil, raw	gall.	0	8	0	to	0	8	3
Portland cement	ton	3	13	0	to	3	16	0
Slates, Bangor	1200	32	0	0	to	35	0	0
Slates, Portmadoc	1200	18	0	0	to	23	0	0
Tiles	1000	6	3	0	to	6	7	0
Turpentine	gall.	0	11	6	to	0	11	9
Yellow pine up to 3×8	standard	39	0	0	to	55	0	0
Yellow pine over 3×8	standard	45	0	0	to	60	0	0

Synthetic Chemicals, Ltd.

To the Editor of THE CHEMICAL AGE.

SIR,—We have read your very interesting Journal from its inception, and can congratulate you on the style of the Journal, whose scope, to our mind, fills a long-felt want.

At the same time, may we be allowed to offer a small criticism? Your very useful list of prices and market report of "Dye Intermediates" appears to be the only one printed with any show of accuracy; but, although it purports to be comprehensive, we notice that several of the most important and widely-used intermediates (which we make in addition to some of those you *do* mention) are not mentioned. You may, therefore, be interested to know that we have been making and selling regularly for months now, the following items, which are not on your lists:—

Pure White R Salt, which we sell at	4s. 1d.	net delivered.
,, Schæffer Acid	3s. 7d.	,,
Croceine Acid	5s.	,,
Pure "G" Salt	6s.	,,

We enclose a tint card of dyes made from our standard makes of these and other intermediates, trusting that they will be of interest.—Yours, &c.

SYNTHETIC CHEMICALS, LTD.
A. W. C. HARRISON, Manager.

Derwent Street, Derby,
October 7.

[The card enclosed of sample tints of dyes, described as "made from the pure dye intermediates of Synthetic Chemicals, Ltd.," includes Fast Red D, Fast Red E, Fast Red A, Ponceau 2R, Ponceau 2G, Ponceau 4GB, Crystal Orange 2G, Naphthol Green B, and Congo Violet.—ED. *C.A.*]

United Indigo and Chemical Co.

MR. GEORGE HEYWOOD, who presided at the annual meeting of the United Indigo and Chemical Co., Ltd., held in Manchester, remarked that their provision for estimated excess profits upon the British portion of the business was half the amount allocated for the preceding year. The present trading profit constituted the company's record, while their net profit was slightly down, owing to increased American war taxation. Since the Armistice trading and labour conditions had been perplexing and trying, including commodity fluctuations and the severe drop in the American exchange, aggregated conditions which prevented a return of the confidence necessary for normal or healthy trading. Meanwhile, their works upon both sides of the Atlantic had been fully employed, and during his recent visit to America he found matters very satisfactory. Regarding the future, present conditions were not too favourable, and it would be unwise to rely upon the maintenance of recent profits, but they were hopeful to continue to show results capable of satisfactory dividends.

Company News

ALGOMA STEEL CORPORATION.—For the year ended June 30 net earnings amounted to 5,035,032 dol., and 764,039 dol. was brought forward. A dividend of 10½ per cent, is proposed on the Preferred Stock, making special appropriations of 2,350,000 dol., and carrying forward 1,433,876 dol.

AMERICAN SMELTING AND REFINING COMPANY.—Earnings for 1918, after providing for fixed charges, were 14,137,167 dol., a decrease of 10,898,770 dol. on the previous year. Deducting the annual charge for depreciation of 3,918,509 dol., or depletion 1,521,121 dol., appropriation for safety and welfare 250,000 dol., miscellaneous profit and loss charges 740,038 dol., there is left 7,707,498 dol. Preferred Stock dividends amounted to 4,247,773 dol. For the first three quarters dividends were paid on the Common Stock at the rate of 6 per cent. per annum, and for the last quarter at the rate of 4 per cent. per annum, leaving at credit of profit and loss 104,834 dol.

ANGLO-JAVA RUBBER AND PRODUCE.—The total receipts for the year amounted to £113,500, as against £261,778 for the previous year. The circumstances accounting for the falling-off were mostly due to war conditions.

ASBESTOS CORPORATION OF CANADA.—For the quarter ended September 30, a dividend of 1¾ per cent. has been declared on the Common shares, payable October 15, to holders of record October 1.

ASSOCIATED PORTLAND CEMENT.—At the twentieth ordinary general meeting of the Associated Portland Cement Manufacturers (1900), Ltd., held in London on Friday, October 3, the payment on March 31 of a half-year's Preference dividend to December 31, 1916, was confirmed, and it was decided to pay 2½ years' dividend on the Preference shares from January 1, 1917, to June 30, 1919, at the rate of 5½ per cent. per annum, less income tax, at the rate of 5s. 6d. in the pound, to shareholders appearing on the register on September 22. At an extraordinary general meeting held subsequently resolutions were passed changing the name of the company to "The Associated Portland Cement Manufacturers, Ltd." dividing each of the existing £10 shares in the company's capital into ten £1 shares, and altering the Articles of Association.

COLTNESS IRON.—Dividend at the rate of 8 per cent. per annum on Ordinary (less interim dividend paid in April), with bonus of 6 per cent., making 14 per cent. for year, as compared with 13 per cent. for the previous year.

DOMINION STEEL.—Dividend No. 31, at the rate of 1¾ per cent on the Preference shares has been declared, payable November 1 on presentation at the Canadian Bank of Commerce, 2, Lombard Street, E.C. 3.

LONGMORN GLENLIVET DISTILLERY.—The report shows a sum of £11,210 at credit of profit and loss account. After providing for depreciation, the directors recommend a dividend of 15 per cent. on Ordinary, place £500 to reserve, and carry forward £7,710, subject to excess profits tax. Last year the profit was £4,005; the carry forward, £5,539; and the dividend, 10 per cent.

MAYPOLE DAIRY.—Share certificates in connection with the recent new issue of Deferred Ordinary shares in Maypole Dairy Company are now ready to exchange for the Letters of Allotment.

PORCO TIN MINES, LTD.—A working profit of £6,243 was made in Bolivia, but after allowing for depreciation of capital items and for London expenditure, a credit balance of £777 13s. 9d. remains. This balance set against the loss of £15,445 1s. 10d. in the previous balance sheet, leaves a net debit balance of £14,667 8s. 1d. to be carried to the balance sheet.

RIO TINTO CO.—Out of the estimated profits of the year 1919, the directors have declared an interim dividend of 20s. per share on the Ordinary shares and also the usual interim dividend for the six months ended June 30 last of 2s. 6d. per share on the 5 per cent. Preference shares, both payable November 1, less English income-tax.

SELANGOR RUBBER.—Interim dividend of 3d. per share (less tax), on account of first six months of the year ended June 30 last. For the corresponding period last year, dividend was 6d. per share on existing capital at that time.

STEEL COMPANY OF SCOTLAND.—The net profit for the year, after providing for all charges and for depreciation of collieries and dwelling-houses and also after making provision for excess profits duty and income-tax, amounts to £136,635. Deducting £2,537 paid to dependants of workmen on military service and adding the balance of £39,928 from the previous year, there is available £174,026. The directors consider that it is again necessary to provide £60,000 for depreciation of steel works plant. They have placed £20,000 to the credit of reserve fund and recommend a dividend at the rate of 15 per cent. per annum (less tax), payable on October 9, carrying forward £41,526.

THE ANGLO-BOLIVIAN RUBBER ESTATES.—Dividend warrants for 15 per cent. have been posted, being the final dividend of 10 per cent. for the year ended June 30, 1918, and an interim dividend of 5 per cent. for the year just closed. The fresh issue of capital has been fully subscribed.

THE GREAT NORTHERN IRON ORE PROPERTIES.—A dividend of $2 per share has been declared.

Stocks and Shares

Commercial, Industrial, &c.

	Quotations Oct. 1.	Oct. 8
Alby United Carbide Factories, Lim., Ord.	1/16–1 1/16	1/16–1 1/16
Associated Portland Cement Manufrs. (1900.) Lim., Ord.	8⅞–9½	10–10⅛
Bell's United Asbestos Co., Lim., Ord.	2¼–2⅜	2¼–2⅜
Bleachers' Association, Lim., Ord.	1⅛–1⅛	1⅛–1 1/16
Borax Consolidated, Lim., Prefd. Ord.	4½–5	4½–5
Bradford Dyers' Assoc. Lim., Ord.	2⅛–2⅛	2⅛–2⅛
British Aluminium Co., Lim., Ord.	1 19/32–1 23/32 xd	1 19/32–1 23/32 xd
British Oil and Cake Mills, Lim., Ord.	2⅛–2⅛	2⅛–2⅛
British Portland Cement Manufrs., Lim., Ord.	1⅝–1½ xd	1⅝–1½ xd
Brunner, Mond & Co., Lim., Ord.	2¼–2⅜	2⅜–2⅜
Castner-Kellner Alkali Co., Lim.	2⅛–2⅛	2⅛–2⅛
China Clay Corporation, Lim., Ord.	⅛–⅜	⅛–⅜
Cook (Edward) & Co., Lim., 4% 1st Mort. Deb. Stock Red.	57–61	57–61
Courtaulds, Lim.	10–11	10–11
Crosfield (Joseph) & Sons, Lim., Cum. 6% Prefce.	1/16–1 1/16	1/16–1 1/16
Curtis's & Harvey, Lim.	2 1/16–2 1/16	2 1/16–2 1/16
Electro Bleach and By-Products, Ltd., 7% Pref.	.. ..	.. ..
Explosives Trades, Lim., Ord.	20/0–21/0	19/6–20/6
Field (J. C & J.), Lim., Ord.	1½–1½	1⅛–1 1/16
Greenwich Inlaid Linoleum (Fredk Walton's New Patents) Co., Lim., Ord.	17/32–21/32	5/16–11/16
Harrisons & Crosfield, Lim., 10% Cum. Prefd. Ord.	1/16–1 1/16 d	1 11/32–1 15/32
India Rubber, Gutta Percha and Tel. Wks. Co., Lim., Ord.	16½–17½	16½–17½
Lawes' Chemical Manure Co., Lim., Ord.	5⅛–5⅜	5⅛–5⅜
Lever Bros., Lim., 6% Cum. "A" Pref.	19/3–19/9	19/3–19/9
Do. 6½ % Cum. "B" Pref.	20/0–20/6	20/0–20/6
Magadi Soda Co., Lim., Ord.	11/16–11/16	11/16–11/16
Manganese Bronze and Brass Co., Lim., Ord.	11/16–13/16	11/16–13/16
Maypole Dairy Co., Lim., Defd. Ord.	13/16–7/8	13/16–7/8
Mond Nickel Co., Lim., 7% Cum. Pref.	1–1⅛	1–1⅛
Do. 7% Non. Cum. Pref.	1/16–1 1/16	1/16–1 1/16
Pacific Phosphate Co., Lim., Ord.	4⅞–5⅛	4⅞–5⅛
Power-Gas Corporation, Lim., Ord.	⅜–⅞	⅜–⅞
Price's Patent Candle Co., Lim.	90–95	90–95
Salt Union, Lim., Ord.	1 7/16–1 9/16	1 13/32–1 15/32
United Alkali Co., Lim., Ord.	1⅛–1⅛	1⅛–1⅛
Val de Travers Asphalte Paving Co., Lim.	1–1⅛	1–1⅛
Van den Berghs, Lim., Ord.	3⅛–3⅜ xd	3⅛–3⅜ xd
Walkers, Parker & Co., Lim.	1⅛–1⅛	1 5/32–1 5/32
Welsbach Light Co., Lim.	2–2⅛	2–2⅛

Gas, Iron, Coal and Steel

Armstrong (Sir W. G.) Whitworth, Ltd., Ord.	36/6–37/6 xd	38/0–39/0 d
Ebbw Vale Steel, Iron & Coal Co., Lim., Ord.	22/0–24/0	1 5/32–1 11/32
Gas Light and Coke Co., Ordinary Stock (4% Stand.)	58–61	58–61
Hadfield's, Limited, Ordinary	38/0–40/0	39/0–41/0
South Metropolitan Gas Co., Ordinary (4% Stand.)	59–62	58–61
Staveley Coal & Iron Co., Lim., Ord.	1⅝–1⅞	1⅝–1⅞
Vickers, Limited, Ordinary	33/6–34/6	35/0–36/0

Mines, Nitrate, &c.

Anglo-Chilian Nitrate and Rly. Co., Ltd., Ord.	15–15⅛	15⅛–15⅜
Antofagasta Nitrate Co. Compañia de Salitres de Antofagasta) 5½% 1st. Mt. Debs. Red.	88–93	88–93
Lagunas Nitrate Co., Lim.	1⅛–1⅜	1–1⅛
Rio Tinto Co., Lim., Ord. (Bearer)	52–54	52–54
Tarapacá and Tocopilla Nitrate Co., Lim.	16/0–17/0	17/0–18/0

Oil and Rubber

Anglo-Java Rubber & Produce Co., Lim.	6/7½–7/1½	7/3–7/9
Anglo-Maikop Corporation, Ltd., Ord.	6/3–7/3	6/3–7/3
Anglo-Malay Rubber Co., Lim.	13/6–14/0	14/1½–14/7½
Anglo-Persian Oil Co., Lim., Cum. 6% Part.	1 7/8–1⅞	1 7/8–1⅞
Burmah Oil Co. Ltd., Ord.	13⅝–13⅞	14⅜–15
Chersonese (F.M.S.) Estates, Lim.	3/10½–4/1½	4/0–4/3
Mexican Eagle Oil Co., Lim. (Cia Mexicana de Pet. "El Aguila" S.A.) Ordinary	8 15/16–9 3/16	10 1/16–10 3/16
"Shell" Transport and Trading Co., Lim., Ord.	8 7/16–8 11/16	9⅛–9⅜
Do. 5% Cum Pref.	9⅛–9⅜	9⅛–9⅜

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

LONDON GAZETTE.

Notice of Intended Dividend

SCOTT, William Robert, residing and carrying on business at 139, Denton Street, Carlisle, chemist. October 20. Trustee, Kighley J. Hough, Official Receiver's Offices, 34, Fisher Street, Carlisle.

Company Winding up Voluntarily

THE FERSAN ISLANDS OIL CO., LTD.—Mr. John Barber, 19, Basinghall Street, E.C 2, appointed liquidator.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, created after July 1st, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]*

ENGLISH BARYTES & MINING CO., LTD., DERBY.—Registered September 20, £1,000 Debentures (filed under Section 93 (3) of the Companies (Consolidation) Act, 1908), present issue, £600; general charge, excluding uncalled capital for time being, *Nil. July 23, 1918.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

BRITISH ULCO COMPANY, LTD.—To buy, sell, manufacture and deal in ores, minerals, and mineral substances of all kinds and similar products, including alloys. Nominal capital, £40,000 in 40,000 shares of £1 each. Minimum subscription, 7 shares. Directors: To be appointed by subscribers. Qualification of Directors: To be a shareholder. Remuneration of Directors to be voted by Company in general meeting. Subscribers: W. T. Dyer, 22, Southborough Road, South Hackney, E. 9; R. E. Hopkins, 1, Great Winchester Street, E.C., and five others.

FRED COCKROFT, LTD.—Manufacturing chemists, &c. Nominal capital, £20,000 in 20,000 Ordinary shares of £1 each. Directors: F. Cockroft, Newport House, Headingley, Leeds; H. F. Cockroft, 12, Manor Drive, Headingley, Leeds; C. Cockroft, 28, Manor Drive, Headingley, Leeds. Qualification of Directors, 250 shares. Remuneration of Directors, £500 each.

GOONVEAN CHINA CLAY AND STONE COMPANY, LTD., 3, Bodmin Road, St. Austell, Cornwall. Nominal capital, £150,000 in 1,500 shares of £100. Qualification of Directors, £1,000. Remuneration of Directors, 7½ per cent. gross profit of Company.

DERBY FERTILISERS, LTD., 3, Market Place, Derby.—Manufacturing chemists. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: G. H. Pudney, 183, Parliament Street, Derby; E. J. Allcoat, 14, Norfolk Street, Derby. Qualification of Directors, £200.

HIRST & CO., LTD., The Soap Works, Dronfield, Derby.—Soap manufacturers. Nominal capital, £1,000 in 700 Preference shares and 300 Ordinary shares of £1. Directors: To be appointed by subscribers. Qualification of Directors, 1 share.

LEEDS AND NORTH-EASTERN TANNERS' FEDERATION.—To promote, develop and protect the interests of the tanning trade. Every member to contribute a sum not exceeding £10 if necessary. Directors: W. L. Ingle, Morley Grange, Charwell, near Leeds; R. B. Thackray, "Ardleigh," Forsforth, near Leeds; C. F. Stead, "Hillside," Glenhow, Leeds, and seven others.

R. McIVOR & SONS (GLASGOW), LTD., 311, Cleveland Street, Birkenhead.—Manufacturers of cement, concrete stone and pottery earthenware of all kinds. Nominal capital, £15,000 in 15,000 Ordinary shares of £1 each. Directors: W. T. McIvor, 311, Cleveland Street, Birkenhead; J. McCracken, 40, Roxbrough Circus, Cardonald, Renfrewshire. Qualification of Directors, 250 shares.

PEARLITE ELECTRIC WELDING COMPANY, LTD., 21, Dale St., Liverpool.—Welders of steel, iron and other metals. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors: G. H. Fraser, 17 Charlesville, Birkenhead (Chairman); J. J. Hayes, "Moos House," Victoria Park, Wavertree, Liverpool; W. Barnes, "Westwood," Hightown, Lancaster. Qualification of Directors, £100. Remuneration of Directors, £50 each.

PREMIER OIL CO., LTD., 2, Gresham Buildings, Guildhall, S.E.—To acquire any petroleum or oil-bearing lands, oil wells, refineries, mining properties, mines, &c., and turn same to account. Nominal capital, £3,750,000 in 5,000,000 shares of 15s. each. Minimum subscription, 7 shares. Directors: W. Norfolk, Cluny House, Helena Road, Ealing; F. Walker, 18, Durham Villas, Kensington, W. 8; J. Fairbairn, 7, Chepstow Mansions, W. 2; F. H. Hamilton, Homefield, Walton Heath, Surrey; A. Whittaker, Palace Hydro Hotel, Birkdale, Southport. Qualification of Directors, 1,000 shares. Remuneration of Directors, £250 each. Chairman, £550.

SOUTH AFRICAN CARBIDE AND BY-PRODUCTS COMPANY, LTD., 2, Broad Street Buildings, E.C. Chemical manufacturers. Nominal capital, £307,500 in 300,000 shares of £1 each and 150,000 shares of 1s. each. Minimum subscription, £7. Directors: C. Partridge, K.B.E., Queen Anne's Mansions, St. James's Park, S.W.; H. D. R. Bayley, K.B.E., Hunmanby Hall, Yorkshire, and Lenton Abbey, Nottingham; C. Bingham, Oaklands, 2, King's Wood Road, Upper Norwood, S.E., and three others. Qualification of Directors, £250. Remuneration of Directors, £300 each; Chairman, £400.

SYNTHETIC LEATHER, LTD.—Synthetic leather and rubber manufacturers. Nominal capital, £20,000 in 18,500 7 per cent. Cumulative Participating Preference shares of £1 each and 30,000 Deferred shares of 1s. each. Directors: T. P. D. Marshall, 1, Grantham Terrace, Bradford, and W. Baines, 9, Fishergate Street, Preston (Managing Directors); J. Stephenson, 38, St. Andrew's Terrace, Bradford. Qualification of Directors, 500 shares. Remuneration of Directors, £1, 1s. each meeting attended.

TREGARON PEAT CO., LTD.—Peat moss litter, peat fuel, cattle cake, artificial manure and fertiliser manufacturers. Nominal capital, £15,000 in 300,000 shares of 1s. each. Directors: H. Averman, V. Musgrave, F. B. Lacey, A. F. Mundy (permanent Directors); Qualification of Directors, 10,000 ordinary shares (permanent Directors). Remuneration of Directors, 10 per cent. of net profits. Subscribers: E. H. Barchard, 22, College Hill, E.C.; T. J. Burningham, 22, College Hill, E.C.

WALTER EVERITT, LTD.—Analyst and manufacturing chemist. Nominal capital, £10,000 in 10,000 shares of £1 each. Directors; A. Cunningham, Canley, Castlemaine Avenue, Croydon, Surrey: J. K. Bisgood, Spencer Cottage, Roehampton, S.W. 15; Managing Director: W. Everitt. Qualification of Directors, 1 share. Remuneration of Directors, £120 each. Managing, Director, £1,000.

WALTER COLLEY, LTD., 151 to 153, Sharlock Street, Birmingham.—Chemists, druggists, &c. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors: A. J. Colley; W. Holt; Ethel M. Holt; Ann Colley. Qualification of Directors, 1 share.

WESTBROOK & THOMPSON, LTD., 101, Southwark Bridge Road, S.E. 1.—Manufacturers of India rubber, leather, asbestos, &c. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors: C. Westbrook, 175, Longfellow Road, Worcester Park, Surrey; S. Thompson, Hill View, Perry Hill, Catford, S.E. (both Governing Directors). Qualification of Directors, 50 shares.

Joint Stock Companies

THE names of the undermentioned companies have been struck off the Register :—

Aberdeen Chemical Co., Ltd.
All British Film Trading Co., Ltd.
Argus Film Service, Ltd.
Bellik (Caucasian) Oil Co., Ltd.
Chamberlain's Drug Stores, Ltd.
De Ros Oil Furnaces, Ltd.
Eclair Film Co., Ltd.
London Asbestos, Ltd.
Metallurgical and General Industries, Ltd.
Metallurgical Research Co., Ltd.
N.B. Oil Shales Syndicate, Ltd.
Produce and Copra Merchants, Ltd.
Standard Feature Film Co., Ltd.
Star Navigation Coal and Fuel Co., Ltd.
Tabasco Copra Syndicate, Ltd.
Trinidad Oil Boring Syndicate, Ltd.

Chemical Merchant's Failure

AT the re-instated sitting for the public examination of Albert Edward Smith, of 18, Beer Lane, E.C., chemical merchant, held on Tuesday at the London Bankruptcy Court, before Mr. Registrar Mellor, the statement of affairs showed liabilities £3,528 18s. 6d., of which £1,528 18s. 6d. were expected to rank as dividend; and assets nil.

The debtor, who was formerly a clerk in the employ of chemical merchants, in 1916 started business as a chemical and general merchant at St. John's Terrace, Forest Gate. He had dealings with the Vulite

Co. in soda ash; but some dispute arose and the legal proceedings which followed cost him £170. He also had dealings with other firms; but disputes arose, as the result of which claims were made against him. The difficulty appeared to be due to the debtor arranging with one firm for the supply of goods and with another to purchase them, counting on making the difference in the buying and selling prices as his profit; and when disputes arose, he was left between the disputing firms. Asked why he entered into such contracts, the debtor said he thought his knowledge of the chemical trade justified him in dealing with such large amounts of chemicals.

The examination was concluded, the alleged causes of failure being loss of trade through the non-fulfilment of contracts, the awards in arbitration awarded against him, and heavy law costs.

Appended is a list of the principal creditors:—

Grant, Hughes & Co., London	£251	18	6
Northern Dyes Chemical Co., Manchester (disputed)	897	0	0
Macdonald, C. L., London	100	0	0
St. Dunstan's Hostel, London	200	0	0
Smith, Mrs. E. M., Hoddesdon	80	0	0

The Affairs of E. F. Heesch

In the Leeds Bankruptcy Court, on Tuesday, before Mr. Gillespie (Registrar), the examination was resumed of Edwin Frederick Heesch, lately residing at 158, Woodsley Road, formerly carrying on business at 212, Wellington Street, as a manufacturer's agent, now residing at 59, Clarendon Road, and carrying on business at Stansfield Mill Yard, 77 & 79, Kirkstall Road, as oxy-acetylene welder and chemical manufacturer, under the style of "The Gatap Company."

The debtor estimated his gross liabilities at £1,013 19s. 6d., of which £924 5s. 1d. is expected to rank for dividend, and the total available assets amount to £155 15s. 7d. He ascribed his failure to "bad trade and losses in the chemical business owing to faulty manufacture." The debtor described himself as "a Dane by birth and German by conquest." He came to England in 1891, and in 1896 began business as a manufacturer's agent, dealing mainly with textile machinery made in Germany.

The examination was again adjourned for further accounts to be filed.

Exports Credits Department

The following announcement by the Board of Trade embodies a previous announcement on the subject of the Export Credits scheme, which was published in our issue of September 13, together with certain alterations and additions bringing that announcement up to date:—The Government are prepared, through the Export Credits Department of the Board of Trade, 10 Basinghall Street. E.C.2, to consider applications for advances up to 80 per cent. of the cost of the goods to the seller (including freight and insurance and the commission paid to the Department by the seller), in respect of exports to: — Finland, The Baltic Provinces (Latvia, Esthonia and Lithuania), Poland, Czecho-Slovakia, Jugo-Slavia.

Notices

(Three lines, 3s.; each additional line, 1s.)

THE HYGEIA RESPIRATOR CO., Inc.

142, Fifth Avenue, New York City, U.S.A.

Manufacturers of the

DIAMOND MASK RESPIRATORS

would like to extend a Sole Agency for the Diamond Mask Respirators in England. These Respirators are used for protection against dust fumes, gases, and infectious bacteria and contagion. For particulars apply in writing.

TULLY'S PATENT

BLUE WATER GAS PLANT

59 Plants in Operation

BALE & HARDY, LIMITED,
39, VICTORIA STREET,
London, S.W.1.

See Advt. in last week's issue

CHEMICAL PATENTS, INVENTIONS, or TRADE MARKS. Advice and handbook free. Write KING'S PATENT AGENCY, Ltd., 165, Queen Victoria St., E.C. 4; or 'Phone Central 682.

For Sale or Wanted

(Three lines, 3s.; each additional line, 1s.)

WANTED.—Price and information concerning Prepared Iron Ore for use in Hydrogen Generators of the iron contact system. Address: GAS ENGINEERING CO., Trenton, N.J., U.S.A.

SPECTROSCOPES, MICROSCOPES, bought, sold, and exchanged. List free. John Browning, 146, Strand, W.C.

VACUUM DRYER.—For Sale, Rotary (Devine make), Cylinder about 26 ft. long × 6 ft. diameter. Jacketed, and fitted with Central Drying Tube. Complete with all Gearing. Can be seen at Works.—Address Box No. 24, CHEMICAL AGE Offices, 8, Bouverie Street, London, E.C.4.

Situations Vacant.

(Three lines, 3s.; each additional line, 1s.)

Unless specially asked for, Original Testimonials should NOT be forwarded with Applications, but only copies of them.

BRITISH DYESTUFFS CORPORATION, LIMITED.
Applications are again invited from well-trained
ORGANIC CHEMISTS
for positions in the Research Laboratories of the above Corporation. A sound training in theoretical work and manipulative organic chemistry is essential. Previous research experience desirable. Apply, with full particulars of career, degrees, etc., to the CHEMICAL SECRETARY, British Dyestuffs Corporation, Ltd., Blackley, Manchester.

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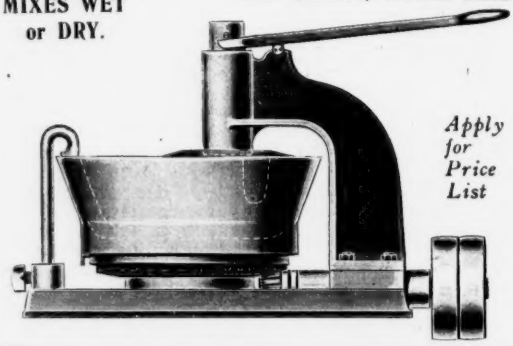

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